THE MEDICAL NEWS.

A WEEKLY JOURNAL OF MEDICAL SCIENCE.

VOL. 83. NEW YORK, SATURDAY, NOVEMBER 7, 1903. No. 19.

ORIGINAL ARTICLES.

MASTOID DISEASE AND EXTRADURAL ABSCESS.

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OF all the intracranial complications of mastoiditis, epidural, or, as it is more frequently called, extradural abscess, is by far the most frequent and on account of its close relationship both to meningitis and sinus thrombosis, it occupies a unique place among the remote pathological changes resulting from extensive necrosis of the mastoid cells. While extradural pus collections, consist essentially of a localized purulent meningitis in which the suppurating area is limited to a small surface of the meninges, yet a distinction should be made between a true epidural abscess, that is a collection of pus localized and confined between the inner osseous wall and the brain membranes and the so-called extradural suppurations which are more or less frequently found during an extensive mastoid operation, where the dura is in part exposed and forms a portion of the inner wall of the purulent cavity in the mastoid.

This latter condition is quite often discovered when the inner wall of the mastoid is reached and, as a rule, is so seldom accompanied by any definite symptoms, or any signs indicative of its presence, that no special clinical significance can be ascribed to it as a definite morbid entity, although, of course, it adds, to some extent, to the gravity of the mastoid necrosis. When the dura is exposed in this manner, it results as a consequence of the bone erosion extending from without inwards, while the true extradural abscess ultimately manifests itself by a reverse process, that is, by eroding the bony areas with which it is in contact, from within, outwards.

The relation of epidural abscess to meningitis is that of a small to a large area of inflammation of the brain coverings; in the one case, the meninges become adherent to the inner table of the skull and completely walls in the purulent collection to a somewhat limited area, while on the other hand, no such protective barrier to the infective agencies is afforded, and a diffuse meningitis results. When the abscess cavity, as is frequently the case, is in close proximity to a purulent accumulation of the external wall of the sinus, the latter is exposed to the dangers of thrombosis. Although the dura and the sinus wall may, for a considerable length of time, successfully resist the disintegrating action of the purulent inflammatory process, yet eventually if the pus collection be not relieved by surgical measures, infiltration and the development of granulation tissue in immediate proximity to the large venous channels, will sooner or later develop and bring about a limited destruction of both these tissues. But as the course of the epidural abscess is essentially chronic, the development of extensive adhesions between the dura, pia and brain substance necessarily ensues and thereby confines the purulent infection to a somewhat limited site. In many of these cases where the tissue destruction has been extensive and the erosive action of the abscess has necrosed in part, the inner mastoid wall, the original mastoid empyema and the epidural abscess surrounding the lateral sinus, are thus brought into contact and a large single pus cavity is formed, involving all these structures, so that when the mastoid operation is performed, the pus from the intracranial complication is evacuated simultaneously.

While the essential primary cause of the dural abscess is that of the mastoid empyema, yet other morbid changes acting as secondary etiological factors are also evident in many cases. Pachymeningitis, leptomeningitis and sinus thrombosis are frequently found combined with the condition under discussion, as the consequence of the abscess, yet not infrequently they may occupy an intermediate place in the causative train of pathologic events. The mastoid infection under such circumstances, involving a small area of the dura and producing a limited pachymeningitis externa which undergoes suppurative changes, and finally resolves itself into an uncomplicated epidural abscess, or in addition, the sinus also becomes infected and a thrombophlebitis adds greater gravity to the dual affection.

The time during which the mastoiditis has existed before the intracranial complication has developed, varies greatly in almost every case, Grunert in a most careful study of 20 cases, having found 12 from acute and the remaining 8 having developed from chronic aural disease. But many factors enter into this phase of the question and the duration of time existing before the dura becomes infected, depends not only upon the severity of the inflammatory process in the bone, but is strongly influenced by the tissue resistance; the form of bacterial agencies present in the given case, and the direction in which the greatest area of bone necrosis leads, the majority of epidural abscesses occurring in connection with mastoid disease being situated in the posterior cranial fossa.

The usual etiological rationale in the development of these abscesses, is based essentially upon the thin wall separating the lining membrane of the mastoid cells from the meninges, becoming necrotic. This portion of the mastoid then breaks down, usually in the form of a minute sinus and a localized meningitis of a low grade is gradually developed about the affected area, so that when the necrotic portion separates, or by means of the

previously mentioned sinus, the infective material is brought into contact with the brain membranes and the diseased site is completely shut off from the general cranial cavity. Instead of these macroscopic bone lesions in connection with the dura, being present, the inner osseous wall may present no evidence of necrotic changes, as the infection will in this class of cases, be conveyed to the cranial cavity by means of embolic or thrombotic processes in the minute venous channels, so profusely distributed in this region; or, in other cases, one of the larger venous sinuses will be involved as the predominating pathological lesion.

Other pathological elements may also be concerned in the individual case and seriously affect the chances of recovery. Such an instance being reported by Lewis, is a woman of twenty-four years, in whom the extradural abscess was of a tubercular nature, but although it was evacuated, the symptoms still continued and she died under the anesthetic, a week later, while a secondary operation was about to be performed. The abscess may also result from a true osteomyelitis, as described by Pouzat, or, in extremely acute cases, such as in two reported by Preysing, there exists a rapidly developing acute inflammation of the compact osseous portion of the mastoid process. Quite often, therefore, the channels of invasion are more or less devious and the pyogenic material is transmitted through the medial and superior walls of the mastoid process into the cranial fossa.

The following case shows this channel of invasion and also illustrates the development of an epidural abscess as the result of an acute mastoiditis.

F. H., female, aged twelve years. With the exception of typhoid fever four years ago, she has always been robust and healthy. She has never had any trouble either with the upper respiratory tract or ears, until two weeks before she first came under my observation when, during a severe attack of influenza, she complained of pain in the right ear. Examination at this time showed a slight congestion of the manubrial plexus, but no bulging of the drum. Dry heat, applied by means of a Leiter coil, gave prompt relief and the aural symptoms disappeared for one week, when the pain again returned with greater severity than before. The membrana tympani was intensely congested and gave decided evidence of the presence of fluid in the tympanic cavity; a paracentesis was then performed and a quantity of thin, yellowish pus was evacuated. The relief from the pain, however, was but slight, although free drainage from the tympanus seemed well established. The temperature was 100° F., while the pulse was 96 and the respirations were normal. Two days later the aural pain had decidedly ameliorated, the temperature and pulse had returned to normal, and while the aural discharge was scant, no untoward symptoms indicative of the extension of the ear disease were present. The following day, however, the temperature rapidly rose to 103° F., the pulse to 110 and headache was complained of over the entire right side, but especially over the mastoid and to some extent further backward toward the occipital region. The mastoid gave no visible evidences of infection and pressure did not increase the pain, although percussion caused her to complain.

The extension of the tympanic suppuration to the mastoid cells was diagnosticated and an operation was advised. No distinctive signs were present that in any way could be construed as indicating the extension of the disease to the cranial cavity, but the general symptom complex and especially the irritability and restlessness, led us to suspect the presence of some irritation of the meninges, in addition to the mastoid empyema. Under ether and anesthesia the usual mastoid operation was performed. The tisuses over the mastoid presented no abnormal changes, but the cortex was exceedingly dense and great difficulty was experienced in penetrating it.

The pneumatic cells were filled with pus and broken-down tissue, especially in the vicinity of the antrum and inner wall. With the exception of the tip of the process, which was healthy, the bone was almost completely eviscerated and free communication was established with the antrum and tympanic cavity, both of which contained considerable purulent material. After a large cavity had been cleansed out in the mastoid, the inner wall appeared to be healthy and free from caries, except at one point well back, where a minute area of softened bone could be clearly distinguished, in the center of which was a thrombosed vein leading apparently to the posterior cranial fossa. With gentle curettage, this portion of the osseous tissue was readily broken down and gave exit to about a half ounce of pus similar to that observed in the tympanic cavity. The sinus presented no evidence of infection and the abscess cavity was formed by the adhesion of the dura to the osseous wall. The cavity was washed out, the parts packed with iodoform gauze and the usual dressings applied. By the following day all the symptoms had disappeared except the headache, which had greatly diminished in intensity, but there was considerable staining of the dressings from the discharge. This however gradually diminished in amount until the ninth day, when it ceased and the mastoid wound went through the usual course. The results in this case were exceedingly favorable as she made a prompt convalescence and has had no further trouble with the ear.

As previously stated, epidural abscess is the most frequent intracranial complication of mastoid empyema and may be the cause of the sinus infection, or may be responsible for the development of a brain abscess. When the latter is also present and the extradural abscess has been evacuated through the diseased temporal bone and the latter has healed, the path of the otogenic infection is necessarily withdrawn from observation and the recognition of the remaining brain abscess becomes most difficult. While the presence

of epidural abscess is quite frequent, it is also as a rule more easily reached than the other intracranial complications and is certainly more satisfactorily treated.

As regards the frequency of extradural abscess in relation to mastoid disease, Picque and Ferrier claim that more than one-half of all cases originate from this cause. Grunert found suppuration on the outer surface of the dura 26 times in 176 acute cases in which the mastoid operation was performed, while it occurred but 39 times in 573 chronic cases. While Gradenigo in 68 cases of mastoid disease on which he operated, found 12 with endocranial complications and of these, 5 were extradural abscesses, all of which recovered. It is interesting also to note in this connection, that in but one case was marked optic papillitis noted and that was in a case of perisinuous epidural abscess in which however, the sinus was not thrombosed. Jansen reports 148 cases of intracranial suppuration, of which 108 were extradural abscesses and Randall states, that in his experience in ten instances within a year, after trephining a suppurating mastoid, the caries of its inner plate was so great, that it necessitated the exposure of the dura and the liberation of pus between it and the bone.

The two most common sites for the development of the pus collection in the order of their frequency, are first, in the posterior fossa near the vertical portion of the groove for the lateral sinus and secondly, in the middle fossa on the superior surface of the osseous tissue forming the roof of the antral cavity. Should the mastoiditis travel backward the perforation into the cranial cavity will probably be through the thinner tissue of the groove previously mentioned, while in some instances where the mastoid cortex is sclerosed, the tendency for the route of the infection is upward and inward and the epidural abscess thereby develops in the middle cranial fossa.

Of course the dangers are augmented when the pus collection is in close relationship to the sinus, on account of the tendency to the production of secondary inflammation and thrombosis, but even under these circumstances, this does not always follow, as a large abscess may exist in this location without producing the least damage to the sinus. Broca records an instructive case in this connection, in which in a child of eight years, a large abscess surrounded the lateral sinus, yet the mastoid was successfully opened, the pus collection evacuated and recovery ensued. While Kümmel cites a somewhat similar case, in which he opened the posterior cranial fossa, removed the contained purulent collection there and his patient fully recovered.

The abscess may vary greatly in size and while some will contain but a few drops of pus, others may contain an ounce or more, the latter while being strictly localized, will yet at the same time, cover a large area and quite closely resemble a diffuse meningitis.

Like the confused and sometimes vague symptom complex of other otitic intracranial affections, the symptoms present in the early stages of extradural abscess, possess no special characteristics distinguishing them from those of the primary focus of infection in the mastoid process. As the localized meningitis becomes more sharply defined, however, and takes on the aspects of the secondary pus collection, there may occur a sufficient increase in the intracranial pressure to produce some symptoms of diagnostic import. If the pressure is much augmented, the symptoms may indicate an abscess of the brain tissue and be sufficient to render an accurate diagnosis impossible, preliminary to exploratory operation. Or again the secondary infection may be somewhat more extensive than usual and spreading to some extent over the immediate brain meninges, will be responsible for the symptoms of meningitis, to the entire exclusion of those of epidural abscess. On the other hand in both acute and chronic cases, an extensive epidural pus collection may form, with but few symptoms and this takes place not only in those with an extra thick mastoid cortex, but also in some cases where the disintegration of the osseous tissue has been exceptionally rapid.

Körner states that every intracranial suppuration does not always produce symptoms from which safe conclusions as to its location can be drawn. This seems especially the case in extradural abscess, as there are but few characteristic symptoms, although one may suspect the existence of this condition, when in the presence of mastoid symptoms, the aural discharge suddenly becomes less, or ceases entirely and the patient shows signs of meningeal irritation. The two most conspicuous signs in a number of the cases, are severe and continuous headache, frequently localized over the affected area and a moderate elevation of the temperature, seldom reaching above 102 degrees, which undergoes slight fluctuations, but seldom reaches the normal.

In the infrequent uncomplicated cases, pyrexia is very slight or absent as a rule, and for this reason these cases are attended with a greater mortality; although the patient may complain of headache and one or two subjective symptoms, yet without fever and in the absence of prominent aural symptoms, the true condition is not appreciated. Temperature is practically always present when the abscess is extrasinuous, but it must be remembered that a rise in temperature may be due to the mastoiditis and not necessarily to the abscess. If the fever cannot be accounted for by the aural disease alone, then one is warranted in suspecting an intracranial complication. In those cases attended with a high temperature at the beginning and in which other symptoms present indicate epidural abscess, an additional complication in the form of a sinus thrombosis or a meningitis will probably be present. Should the temperature not be sufficiently elevated to suggest either of the latter conditions, the question of the presence of a cerebral abscess will have to be considered, but the absence of localizing signs and the presence of some elevation, instead of a subnormal tem-

perature, will greatly aid in eliminating this factor.

In rare instances, however, localizing symptoms may be present, due to the pressure of the pus collection on adjacent brain areas, but it is extremely uncommon, as the large majority of epidural abscesses do not exert any pressure upon the motor tracts. When such symptoms are present they usually take the form of a crossed paresis, alteration in the sensibility and some minor disturbance in the special senses. An interesting case showing some of these features being reported by Milbury, in which the abscess pressed on the left temporosphenoidal lobe of the brain and produced facial paralysis of the left side, slight paralysis of the right arm and leg, mental impairment and amnesic aphasia.

Pain in the head is one of the most constant and valuable symptoms and is generally present in practically all cases. As a rule it is confined to the side corresponding to the intracranial lesion and often is limited to a localized area. It varies much in intensity and an intermittent headache may for a time, be the only symptom; it is usually more severe than the pain caused by the mastoiditis and is apt to occur in paroxysms. The tissues over the site of the pain sometimes being exquisitely tender even on the slightest pressure and this symptom may in conjunction with others, give some indication of the location of the abscess.

The pulse rate varies with the degree of associated meningeal irritation, and when the latter is prominent, an accelerated pulse is frequent, especially in the early stages, but later when the acute symptoms subside, it is apt to become slightly slower than normal. Schmiegelow reports an interesting case of an epidural abscess in a boy of twelve years, in which the symptoms were a slow pulse, subnormal temperature, nausea, dulness of intellect and headache. The abscess was on the floor of the middle cranial fossa and the patient recovered after its evacuation, while the author states, in commenting on the case, that he has never before found a slow pulse associated with epidural abscess alone. As a rule, therefore, little dependence can be placed upon the rate of the pulse in this affection.

Rigors are rarely present in uncomplicated cases and if they should develop, the presence of a complicating involvement of the venous channels may with considerable assurance be presumed. Although Barr records several cases in which the special features were frequent and repeated rigors with a high temperature, yet no evidence of sigmoid sinus involvement was found. Vomiting is apt to occur when the paroxysms of pain are greatest and it may occur without nausea, but it usually indicates some meningeal irritation and when the abscess is located in the cerebellar fossa, the vomiting is apt to be associated with vertigo or some disturbance of the equilibrium. Both these symptoms have little symptomatic value and like the anorexia, coated tongue and constipation, possess no diagnostic value alone. Slow cerebration, or some degree of mental dulness, occurs only in the later stages and without reference to the location of the pus collection. Its origin is somewhat obscure, but it is probably due to some increase in the intracranial pressure from moderate effusion into the ventricles. Optic neuritis is but rarely found and as a symptom of epidural abscess, the eye grounds afford no information.

As well showing the grouping of the symptoms, the following cases reported by Knapp are instructive. In the first case there was headache, nausea, dizziness and some stupor. The mastoid became swollen and tender and an operation failed to disclose the presence of pus. Four days later, however, there was a free discharge of pus from both the mastoid opening and the ear, with some relief of the symptoms. These, however, returned with a rise of the temperature to 105° F., and death followed. The autopsy disclosing a purulent leptomeningitis of the left temporal lobe and lateral ventricle and an epidural abscess on the inner side of the mastoid and in and about the foramen lacerum. The second case commenced with pain in the forehead, right ear and occipital region, but no fever. A puncture of the drum head relieved the pain and gave exit to a purulent discharge and the symptoms did not again return for six weeks, when pain in the right occipital region recurred, with fluctuation and swelling of the tissues. A large incision was made to the bone and a quantity of creamy pus liberated, while a spontaneous opening was found extending into the intracranial cavity. The patient succumbed, however, five months after the onset of the disease and the necropsy showed that the inner table of the mastoid was absent, while a large cavity filled with pus extended from the outer surface of the lateral sinus to the external cortical fistula. In addition there was also an abscess in the cerebellum.

Little need be said here as to the character of the pus present in the abscess, but in acute cases it is usually yellow and odorless, while in the chronic cases it is apt to be ichorous and brownish or greenish in color.

Even under the most favorable conditions the diagnosis of an epidural abscess is both indefinite and obscure and in many of the cases, there are no distinct symptoms by which the surgeon can recognize the pus collection before operation. The chief diagnostic symptoms are the headache and a temperature which continues after the mastoid has been opened; the condition of the ear at this time may render some information, especially if there is a subperiosteal abscess behind the mastoid, or a variable amount of edema extending backwards to the occipital region. Or, again, when the abscess is located in the middle cranial fossa, the edema may extend above and behind the mastoid, while the latter remains free, but is sensitive to pressure. In many cases evidences of the extradural abscess are only disclosed when during a mastoid operation, a fistula is found leading into the cranial cavity, or the medial wall of the mastoid has broken down. In not a few

of the cases symptoms of meningeal irritation, such as headache, slight rise of temperature, somnolence, pain on pressure, slowing of pulse, vomiting and stiffness of the neck, may lead one to suspect the development of an abscess, but usually these symptoms are indefinite and afford little diagnostic value.

The differential diagnosis between extradural abscess and meningitis may be made by the high temperature, rapid pulse, irritability, general excitement, restlessness and hyperesthesia of the special sense organs in the latter, in contrast with the slow cerebration, apathy and drowsiness in the former. One may find, however, a slow pulse with a temperature of meningitis, and in such cases, both the conditions may coexist at the same time. If the diagnosis still remains in doubt in the presence of meningeal symptoms, lumbar puncture should be performed and if it gives a negative result, then an epidural abscess or a sinus phlebitis, or both, are probably present. Macewen and Milligan state that the symptoms of an extradural abscess always dominate and mask those of a brain abscess, when the two occur together and it is not until the former is relieved by operation, that reliable evidence of the presence of a brain abscess can be obtained.

In a few instances of uncomplicated epidural abscesses, if, after opening a subperiosteal pus collection, a bone fistula is detected, through which a probe can be passed into the cranium, we may be assured that an abscess exists. While in some cases, a doughy swelling forms with some tenderness on pressure about one inch behind the meatus, at the point of exit of the mastoid emissary vein. When this is conspicuous and the other symptoms enumerated are present, in conjunction with the history of the aural disease, it strongly indicates an intracranial complication and we may be fairly positive that we have to deal with an epidural abscess. Grunert believes that an exact diagnosis is impossible and the surgeon must proceed with a diagnosis of probability until the mastoid has been operated upon. Friedreich states that mastoid operations are frequently interrupted by the finding of an abscess between the bone and dura and from the expansile pulsation it is easy to recognize the endocranial origin of the discharge. The dura recedes before the pressure of the pus and an abscess cavity is formed between the bone and dura, which leads to compression of the cerebral substance and sometimes it attains such enormous dimensions that the pus makes its way to other regions. While Bacon states that frequently when operating for mastoid inflammations, the surgeon finds a carious opening just over the sinus, even when the symptoms were only those indicating mastoid disease.

In contradistinction to the probable diagnosis sometimes, though rarely, made by the symptoms alone, there still exists what may well be called the surgical evidences of the disease; in other words, the signs that are found during the mastoid operation indicative of epidural abscess. Green concisely states this aspect, when he says that early operation is advisable, for an exact diagnosis is often impossible and the chances are largely that a fistula through the bone from the ear, will lead directly to the brain disease. This, therefore, gives justification for early exploration of the bone and as the disease of the bone originates from the suppurating ear, the latter is the cavity from which we should explore. Furthermore, as the infected ear requires operation in any case, this operation can readily be combined with an examination of the fistula and the recognition and treatment of the brain disease.

If on opening the mastoid, the pus is seen to pulsate, there is every probability that it communicates with the cranial cavity and after the diseased area here has been removed and a fistula is found, it should be traced to its termination in the epidural abscess. Again in a suspected case where the diagnosis has not been fully determined, the mastoid operation is first performed in the usual manner, the vertical groove for the lateral sinus is then exposed and the sinus is examined and treated according to the pathologic changes found. The course of the sinus is then traced upwards and backwards to its horizontal portion, where immediately above is the middle fossa, while below is the posterior fossa. If the epidural abscess should be found in the neighborhood of the lateral sinus, it is evacuated and dressed in the usual manner, but if no pus collection exists at this point, a flexible grooved director may cautiously be passed in various directions between the dura and the skull, in order to locate an abscess in other positions.

The following case, seen recently, well exhibits the danger a patient may be in from an epidural abscess and yet without sufficient subjective symptoms to warn him to seek early relief:

B. M., male, aged thirty-two years. At the age of fifteen years the right ear became inflamed and suppurated from causes unknown to him. From that time until the past six months, it was more or less constantly moist and at varying intervals, the suppuration would become profuse for a few days, to again be reduced in amount by local treatment. He has always enjoyed good physical health and except for the annoyance of having the ear moist, he considered it of little moment, until six months before I saw him, when the discharge became profuse, fetid and slightly greenish in color. Instead of moderating as it usually did under the routine treatment he had been receiving, it still continued and he began to suffer with frequent headaches over the frontal region. This continued for nearly two months, when the pain in the head disappeared from the frontal region, but became severe over the mastoid. During the next four months, he stated that he lost twelve pounds in weight, had a variable appetite, would have to give up work at times on account of the pain and weakness, and would have variable attacks of fever, but he never had any chilly sensations. Three weeks be-

fore he first consulted me, with all the symptoms continuing and the pain extending further back over the occipital region, an abscess formed back of the ear, which was opened by a small, superficial incision, with the escape of considerable pus. As this afforded no relief to the symptoms and the pus still discharged from both the ear and the incision, he was referred to me for examination. At the time when I saw him, there was a fistula well back on the mastoid, from which considerable pus was exuding and which admitted a small probe but a short distance, evidently on account of its irregular course. The membrana tympani was in great part destroyed and no evidences of the malleus or incus could be recognized. The mastoid was swollen and the tissues infiltrated around the sinus and the entire side of the head well back over the occipital region was extremely sensitive to the touch. He was very nervous, the temperature was 101° F., and the pulse 90, and there was a slight degree of mental dulness, while he states that he had been vomiting for several days past and became dizzy if he moved about much.

In addition to the mastoiditis, the presence of a purulent intracranial collection was so palpable, that an immediate operation was insisted on. The mastoid was opened and was seen to consist of a large pus cavity, the osseous tissue of its interior being in great part destroyed by the carious process, while even the cortex was exceedingly fragile, as the slightest pressure with the curette would suffice to break down the disintegrating bone. Immediately on exposing the mastoid interior the contained pus was seen to pulsate and when this was removed with the necrosed bony tissue and after communication had been established with the antrum and tympanic cavity, a large opening was found in the posterior wall, exposing the inflamed dural surface. This led into an extensive pus cavity between the dura and bone, which was evacuated, thoroughly washed and the sinus was then further examined, but was found to be unaffected. The treatment was the same as in the former case. Evidences of considerable meningeal irritation were present for several days following the operation, but other than this the improvement was marked and as the restlessness and dull ache in the head soon passed away, his convalescence continued uninterrupted and he made a speedy recovery.

In both the cases here reported, the bacterial examination of the discharges showed a polymicrobic infection, but the ordinary pus organisms predominated. Usually, however, in the acute cases, the pneumococcus plays an important part, and in the presence of even minor symptoms associated with this organism, we are justified earlier than in the presence of other organisms, in suspecting the development of an extradural abscess. The relation of the micro-organisms to the intracranial lesion has been especially marked out by Leutert, who maintains that it is the reduction in the virulence of the specific micro-organisms that effects the occurrence of a circumscribed meningitis, the preliminary condition of nearly all brain abscesses. Whereas virulent bacteria, if they ever reach the surface of the dura spread so rapidly over the leptomeninges, that a diffuse meningitis is the speedy result.

The final termination of an extradural abscess, if not recognized, will vary greatly, depending upon the direction in which the greatest destruction of tissue takes place, but they remain quiescent for long periods of time and may finally open externally. In 12 cases reported by Grunert, 4 opened outward and formed a subperiosteal abscess. While Urbantschitsch also records a case which spontaneously evacuated. Very often the epidural pus collection is the connecting link between the ear disease and a more dangerous intracranial complication, while in other instances, it is impossible to say whether the epidural abscess is the cause or the effect of the deeper otitic lesion in the cranium. In the same way it may be closely allied to a leptomeningitis, or sigmoid sinus phlebitis, but in the great majority of neglected cases the dura perforates and the patient dies from a consecutive cerebral abscess, or a purulent sinus thrombosis and leptomeningitis. As regards the spontaneous evacuation of the abscess, Knapp states that it may open into the ear, through the medial wall of the mastoid, the roof of the tympanum, the squama temporalis, or through the occipital bone, above and behind the ear canal.

In recognized cases, the prognosis as regards cure is extremely favorable if the abscess be evacuated by operative procedure and undoubtedly this affection under such circumstances, gives the greatest number of recoveries of any of the intracranial complications of mastoid disease. In Grunert's 20 cases, 11 of the 12 acute abscesses recovered and of the 8 chronic instances, 2 recovered, while 1 died later of pulmonary tuberculosis, 2 were still under treatment, 1 uncured refused treatment and in 2 the results were unknown. The successful issue in the large majority of reported cases of epidural abscess, has been essentially due to operative evacuation.

No other treatment than the surgical release of the purulent collection should be considered and as a guiding principle in operating on these cases, one should always proceed from the primary origin of the infection in the mastoid and trace the course of the disease to its final conclusion in the cranial cavity. As the surgical measures necessary in treating these cases have been to a great extent already mentioned, it is only necessary here to state that the mastoid should first be opened, the abscess located and evacuated, and the dressings and after-treatment should conform with those applicable in mastoid operations.

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PRECIPITINS AND THEIR MEDICOLEGAL USE.

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SCOPE OF DEMONSTRATED PRECIPITINS.

PRECIPITINS FOR ALBUMINS OF BLOOD.—The original observations from which began the development of the medicolegal serum test for blood were those of Kraus, 1897, who obtained albuminous precipitates in filtered cultures of *Bacillus cholerae, B. typhosus,* and *B. pestis,* by the addition of homologous immune sera, and that of Tschistovitch who obtained a precipitate in eel serum by means of anti-eel serum from the rabbit.

Very soon contributions from many sources demonstrated the fact that most but not all animals develop antisera with precipitating properties (precipitins) against most alien bloods. Bordet produced in a rabbit a precipitin for chicken blood, and pointed out the distinction between the precipitating and the agglutinating and hemolytic actions of such antisera. Uhlenhuth secured in rabbits precipitins for the blood of the chicken, beef, and man; Wassermann, Schutze, Stern and many others studied the actions of the precipitins of humanized rabbit blood. Nuttall and Dinkelspiel prepared several blood precipitins, including those obtained by treating rabbits with the blood of the dog, sheep, beef, horse and man. Nuttall later obtained, apparently in the rabbit, precipitins for the blood of the fowl, pig, alligator, turtle, frog and lobster. Grünbaum prepared antisera for the blood of the chimpanzee, orang and gorilla, in animals not stated. Von Dungern experimented extensively with precipitin for crab's blood (*Maja squinadox* and *Dromia vulgaris*), developed in rabbits. One of us has found that the chicken produces an active precipitin for human and rabbit bloods. Noguchi found the normal serum of several cold-blooded animals to contain precipitins for other cold-blooded animals and for horse serum, while leaving somewhat uncertain the possible increase of these agents by immunization of such cold-blooded animals. Metchnikoff, Mesnil and v. Dungern, failed to increase natural or produce new precipitins in various cold-blooded animals. DeLisle, working with eel blood, failed to immunize the guinea-pig against this serum as the animals invariably died, but, with more difficulty than Tschistovitch describes, he produced in the rabbit an active hemolysin and precipitin for eel blood, and in the eel hemolysin and precipitin for rabbit blood.

In the experience of the above observers it has not always been possible to obtain in every animal, a precipitin or hemolysin for every other animal blood. Thus Bordet failed in this attempt with guinea-pigs treated with rabbit's blood, but one of us recently secured in guinea-pigs, an active hemolysin and precipitin for rabbit's blood. Nolf failed to obtain a precipitin from pigeons treated with chicken blood, and Nuttall from rabbits treated with cat's blood. These results, in the case of closely related animals, must be referred to the lack of antagonism between the blood of such animals, and in the other case to the excessively poisonous effects of the eel serum.

It may here be noted that Friedenwald found that when an animal is injected with the serum of a closely related animal, the albumins pass rapidly out of the system with albuminuria, while the more distinctly alien blood is retained in the system apparently absorbed by the body cells.

PRECIPITINS FOR MILK.—From the earliest stages of the study of blood precipitins, investigations have been directed to specific sera antagonistic to other body cells and other forms of albumins. Bordet first produced in rabbits by injections of sterile cow's milk a serum precipitating in slight dilution the albumins of such milk. Fisch prepared specific precipitins for the casein of cow's milk, which failed to affect either goat or human milk. He also injected an emulsion of udder cells and obtained a specific precipitin for the milk of the same animal, and concluded therefrom that milk represents a solution of the gland cell albumins and not merely a filtration through the cells. Wassermann and Schutze obtained in rabbits precipitins for human, goat's and cow's milk, which in moderate dilution proved highly

specific for each variety of milk. Hamburger obtained specific precipitins for both the albumin and the casein of cow's milk, both of which sera acted similarly on beef serum, but the serum obtained after injections of beef blood, had no effect on cows milk. This result indicates that both serum and milk contain receptors which produce precipitins for serum albumin, but milk contains other receptors which develop a special precipitin for the albumin of milk.

That other tissue cells contain the milk-coagulating receptor is indicated by the results of Meyer and Aschoff, who obtained milk coagulins by injections of various tissue cells. While some reports indicate high specificity for the milk coagulins, Moro found that the precipitin developed by cow' milk precipitates also goat milk. Careful dilution of the test serum has apparently not been observed in this field.

PRECIPITINS FOR MUSCLE AND BONE ALBUMIN.—Schutze produced a specific precipitin for human muscle, which was inert on human albuminous urine or blood serum, but proved hemolytic. Cooked muscle also yielded a similar precipitin, as did also an albumin separated chemically from muscle tissue. Jez and Uhlenhuth have since employed this biological method for the detection of different meats, and Schutze has applied it with some success to the differentiation of bones.

PRECIPITINS FOR ALBUMINOUS EXUDATES.—Many observers have found that albuminous exudates in pleuritic, ascitic, and hydrocele fluids and albuminous urine, are almost as active in developing precipitins for blood serum as is the blood itself. As such fluids are readily obtainable they are often employed instead of blood for the preparation of blood precipitins for medicolegal purposes, but there are various reasons for avoiding such expedients.

LeClainche and Vallée first employed intravenous injections of urine containing one-half grain of solid albumin per liter. The rabbits suffered considerably from the treatment but after three months their sera actively precipitated urine containing serum albumin. They gave a slight precipitate with urine containing much globulin, but were inert with human blood serum, or serum from the horse, donkey, sheep and beef. Mertens found that injections of albuminous urine yielded less precipitin for the albumins of the urine or blood than did injections of blood. Zuelzer, who also employed highly albuminous urine, concluded that the injected urine must contain some blood albumins but not these exclusively. Biondi found that injections of kidney tissue free from blood yielded precipitins both for blood and for albumins in the urine, while Schattenfroh found that injections of albumin-free urine, if not heated, produced blood hemolysin and agglutinin but no precipitin. A comparison by Dieudonné of the activity of the serum yielded after injections of albuminous urine, pleuritic exudates and blood serum, showed a considerable difference in favor of the blood serum.

SPECIFIC PRECIPITINS FOR ALBUMINS, GLOBULINS AND PEPTONES.—Several observers have endeavored to separate the different proteids of blood and to test their actions apart from the mixtures in which they naturally occur. Nolf separated the plasma from the cells of chicken and dog blood and secured in each case precipitins only from the animals receiving injections of the plasma. He precipitated the globulin twice by saturation with magnesium sulphate and washing, and separated the albumins from the dialized filtrate by the addition of one per cent. Ac. adding NaCl and sterilizing at 56° C. for eight days.

Rabbits treated with the globulin developed a precipitin while those receiving the albumin did not. That the substance precipitated (precipitum) is a globulin he concluded from the fact that the active serum had no effect on solutions of serum albumin but gave abundant precipitates in solutions of globulin.

Biondi failed to obtain a precipitin by injections of serum albumin, but succeeded by the use of the globulin precipitated by $MgSO_4$.

In reference to these experiments it may be remarked that the serum-albumin may have been greatly altered in character during its separation.

Myers secured from rabbits precipitins for crystallized egg-albumin, sheep globulin, beef globulin, and Witte's peptone, by injections of each of these substances. Rather numerous control tests showed these precipitins to be highly specific but not absolutely so. The peptone serum was peculiar in losing much of its activity when heated to 56° C., and on being reactivated by normal rabbit serum, while all the sera agglutinated various blood cells. Pick and Spiro also claim to have secured a precipitin for albumoses.

Uhlenhuth injected chicken egg-albumin dissolved in salt solution and obtained a powerful precipitin which had a slight action on pigeon egg-albumin, and resisted heating to 60° C. for one hour. Feeding the animal for twenty-four days with the same albumin also developed the precipitin, but Moro and Hamburger failed to obtain any lactose serum by forced feeding of young animals by milk. Obermeyer and Pick and Umber separated the different albumins and globulins of the white of egg, and while they all caused the development of precipitins, these precipitins were not specific for the different proteids of the egg. Modica and Corin also obtained precipitins by injections of globulin precipitated by magnesium sulphate. Corin secured the globulins from cadaver blood and ascitic fluid, and demonstrated that the precipitin is also a globulin, and he recommends its preservation in the form of a dry powder containing magnesium sulphate. Strong solutions of this powder he found more active than the fresh serum from which it was derived.

Somewhat dissimilar results were obtained by later observers. Rostocki, Landsteiner and Calvo, found that the serum of rabbits immunized to horse globulin precipitates both globulin and albumin of horse blood. In Michaelis' hands in-

jections of pure globulin gave a serum precipitating globulins only, while injections of pure albumins gave a serum precipitating both albumins and globulins. As he obtained the globulin by partial saturation with ammonium sulphate, his experiments are not exactly comparable with those in which the globulin was precipitated by magnesium sulphate. He failed to obtain a precipitin from Merck's egg-peptone or Riedel's peptone, and points out from the observations of Buchner and Geret that Myers' peptone precipitin probably represents a precipitate of barium sulphate. Tschistovitch also failed to obtain a precipitin for peptones. Ide and Leblanc both report that they have secured specific precipitins for pure albumin and pseudoglobulin of beef blood, and Hamburger claims that the casein and albumin of milk may be separated by their specific antisera.

Obermayer and Pick[2] report that beef serum heated to 60° to 70° C., which destroys its reaction to the antiserum, is capable on injection into rabbits of developing a serum which precipitates not only fresh beef serum but also beef serum heated to 60° to 70° C. By employing such heated sera they secure what may be called a polyvalent serum which may possibly prove of value in testing blood which has been subjected to heat. Likewise beef globulin carefully oxydized at room temperature by potassium permanganate and thus deprived of its capacity to react to normal antiserum will devolop a serum which precipitates the oxydized globulins and to some extent the fresh globulins.

The observations of Klein indicate that the precipitins produced by the albumins of the red cells and those produced by the albumins of the serum are not identical.

Finally it should be mentioned that Camus and Bordet obtained precipitins by injections of fibrin.

From the above data it may be concluded that the most active principle of blood in exciting the development of precipitins, is the globulin. Possibly it is exclusively the globulin which possesses this property, but further evidence on this point is required. Peptones, have so far failed to develop precipitins.

PRECIPITINS FOR VEGETABLE ALBUMINS.—From the reports of Schutze and Kowarski, it appears that precipitins have been obtained for vegetable albumins, the former using *"roborate,"* while Kowarski's precipitin for wheat albumose acted also on albumoses of rye, peas and barley, but not on that of oats. Connected with the precipitins for vegetable albumins is the entire field of specific bacterial precipitins.

The above series of observations on the great variety of already demonstrated precipitins has been briefly collated for the purpose of presenting the more important results in compact form, but especially to emphasize from the medicolegal standpoint that the existence of specific precipitins is not an isolated scientific fact, but that the discovery of these bodies has brought to light a very comprehensive and entirely new principle in biology.

By virtue of their complex molecular constitution the various members of the different classes of proteids of the animal and vegetable kingdoms are found to differ from each other, not merely in some of their grosser chemical reactions, but by a new series of properties of obscure character indeed but no more surprising and no less definite than that recognized in meats by the sense of taste. Moreover, Ehrlich's conception of the mode of origin of these precipitins and other antibodies has offered a logical explanation of these peculiar phenomena and removed much of the obscurity surrounding them. The factors concerned in the precipitin reaction may now be considered in detail.

NATURE OF THE PRECIPITIN REACTION.

For the full discussion of the principles governing the development and action of precipitins, according to Ehrlich's conception of them, the reader is referred to the original articles of Ehrlich and to the summaries of Ritchie in English and Aschoff in German. Here it need only be said that the precipitins are cast off cell receptors (side chains) of Order II, possessing a stable haptophore group uniting with the coagulable molecule and a more or less labile zymophore group, which exerts a precipitating action on the affected cell or molecule.

As to the nature of the process by which the large proteid molecule is precipitated from solution, recourse must be had to the laws governing variations in surface tension.

The bodies concerned in the development and action of precipitins may be divided into three classes: (*a*) Those exciting the development of the precipitating substance of the serum; (*b*) those constituting the precipitating substance; (*c*) those constituting the precipitate and affecting its formation.

(*a*) SUBSTANCES EXCITING THE DEVELOPMENT OF PRECIPITINS.—From the foregoing section it will be seen that this property has been shown to reside in most classes of proteids both animal and vegetable, including serum globulin, and the globulins separated by fractional precitation by ammonium sulphate, [serum-] and egg-albumins, albumins of tissue cells, vegetable albumoses, and gelatine; while mucins and peptones have not yet been included in the list.

From what had previously been shown, regarding bacterial immunizing substances, it appeared likely that of all of these substances the globulins were most active in developing precipitin, and this conclusion has been strengthened by the results of many observers working with blood precipitins. Nolf and Biondi failed to obtain any precipitin from injections of pure serum albumin, while in the reports of many others, who succeeded in this attempt, there has been little effort to compare the activities of the serum on the respective substances injected.

(*b*) WHAT CONSTITUTES THE PRECIPITATING SUBSTANCE.—As has been previously shown for the majority of the specific antibodies, the precipitins belong chiefly or exclusively in the class of

globulins. Yet the studies on which this generally accepted conclusion is based were principally concerned with the antibodies for injected globulins, so that it is perhaps too early to say that all precipitins belong in the class of globulins.

Corin by saturation with Mg. sulph. at 30° C., precipitated the globulins of serum prepared against defibrinated blood and found a 4.5-per-cent. solution of this precipitate more active than the original serum. Michaelis precipitated the globulins by partial ($^3/_{10}$) saturation with ammon. sulph., and found the precipitate to contain practically all the active properties of the serum, and that the dissolved precipitate acted only on globulins, not on serum albumin. Ziemke found the globulins precipitated by ammonium sulphate, and dissolved in soda solution, less active than the fresh serum and therefore could not fully endorse the suggestion of Michaelis to precipitate the globulins in order to preserve the active principle of the serum. Moreover Pick found that the precipitated globulins of typhoid serum deteriorated much more rapidly with age or by heating than did the original serum. The precipitin belonging in the class of Ehrlich's receptors Order II, as already mentioned, contains a more or less labile zymophore group, which may suffer deterioration while the haptophore or cell-binding group is still intact. Thus arise in a variety of ways the inert forms of precipitins called precipitoids.

(*c*) WHAT CONSTITUTES THE PRECIPITUM.—That the precipitum from blood serum is a globulin was first claimed by Nolf, from the fact that his antiglobulin serum precipitated a solution of that globulin, but not one of serum albumin. LeBlanc came to the same conclusion from the analysis of the precipitum obtained from solutions of hemoglobin. P. Müller found the precipitum from milk, resulting from the action of its antiserum, to consist of casein. The precipitum also contained the precipitin itself, which he succeeded in extracting in active form by strong acetic acid. Von Dungern precipitated by its antiserum the blood of *Octopus vulgaris* which contains a single albumin, hemocyanin, characterized by a 38-per cent. content of Cu. In the precipitum he recovered a considerable portion of Cu. The dissolved precipitum was non-dialyzable.

The general properties of the precipitum are those of albuminous substances. Tschistovitch found the sediment of eel serum insoluble in water or alkaline carbonates or neutral salts, but soluble in dilute acids and alkalies. It was non-toxic to rabbits. Bordet, Michaelis and others also proved the solubility of the precipitum in dilute acids and alkalies. Uhlenhuth dissolved blood precipitum in NH_4 OH and H_3 PO_4. On the other hand there is evidence to show that the substance attacked by the precipitin is not necessarily a proteid, but may be merely associated with or derived from the proteids. Thus Obermayer and Pick found that the precipitable substance of white of egg may be altered by frequent crystallization and by digestion with pepsin, so that it no longer gives the biuret reaction, although still precipitating with antiserum. Jacoby and Haussman also digested ricin and abrin with trypsin, destroying the biuret reaction, but the usual precipitate followed addition of antiricin. Their results do not indicate, as v. Dungern says, that the molecule uniting with the precipitin was not originally connected with the natural albumins of the solution, but they at least show that these albumins may suffer considerable alteration without losing their affinity for precipitin, and they have practical bearing on the results of the precipitin test in decomposed blood.

The relative proportions of precipitin and precipitable substance entering into the precipitate may be estimated in approximate degree in the light of certain observations. Linossier and Lemoine found that 25 parts of an active humanized rabbit serum were completely neutralized by one part of human serum, while 200 to 300 parts of rabbit serum was necessary to remove the precipitable substance from one part of human serum. These results do not justify more than the conclusion that the precipitin is usually vastly less abundant than the precipitable substance. From the investigations of Eisenberg and Volk on typhoid agglutinins, it is evident that the absorptive power of agglutinins varies with their dilution, being greater the higher the dilution. This same rule seems to apply to the precipitins and has important bearing on the technic of the serum test.

ARTIFICIAL AND SPONTANEOUS CHANGES IN PRECIPITIN SERUM.

EFFECTS OF AGE.—All observers have found that precipitin sera rather rapidly deteriorate with age, and recommend careful preservation in sealed tubes, on ice, and in the dark. There are, however, very few reports regarding the duration of active properties of serum thus preserved, and the significance of such reports vary greatly with the original strength of the serum. Strube and Uhlenhuth both found serum still active after three months, the latter having preserved his specimen with .5 per cent. carbolic acid. The addition of chloroform commonly recommended prevents bacterial growth, but does not save the serum from gradual deterioration. From such serum Ziemke reports considerably diminished activity after more than three months. Okamoto found his chloroformed serum sealed in glass tubes still active after one month, but inert after two or three months. Corin and Stockis found the dog globulins still active after two months, but do not report on their later condition. Chirokikh found that filter paper soaked in the serum yielded an active precipitin solution after one month.

We were unable to detect any loss of activity of a powerful humanized serum after ten days on ice without preservative. The serum of two beef rabbits kept on ice with chloroform showed no distinct change, one after sixty-three days, the other after eighty days. A powerful humanized

serum kept ten months on ice with chloroform, and which showed a greenish discoloration and had probably become somewhat concentrated by evaporation, still gave an abundant flocculent precipitate at dilution 1 in 30 in two hours in human serum 1 in 100. Controls on heterologous blood were negative in all the above reports. We agree with Ziemke that no method of preservation can replace the advantage assured by working with fresh serum.

EFFECTS OF HEAT.—Many precipitins have proved comparatively resistent to heat. Jacoby found antiricin active after heating for two hours at 60° C. Myers exposed the antisera of egg albumins and globulins to 56° C. for one-half hour without altering their activity. Tschistovitch found his anti-eel serum less active after heating to 60° C., and inert after heating to 70° C. Uhlenhuth's antiserum for egg albumins was unchanged by heating for one hour at 60° C. Leclainche and Vallée heated their antiserum from albuminous urine for two hours at 58° C., without diminishing its activity. Michaelis destroyed his blood precipitin by two hours' exposure at 68° C. Biondi concluded that blood precipitin serum begins to lose its activity when heated to 65° to 70° C., but if dry resists heating up to 130° C. Eisenberg found the dry globulin active after heating one-half hour at 100° C., but inactive after the temperature reached 130 to 135° C. One of our potent beef rabbit sera was rendered almost entirely inert by heating in a water bath at 55° C. for fifteen minutes, while not a trace of reaction occurred after heating to various moderate temperatures above 55° C. A humanized rabbit serum, however, lost little activity by heating to 60° C. for fifteen minutes, but became practically inert after fifteen minutes' exposure at 65° C. Michaelis has studied extensively the inhibition of precipitin reaction by heated precipitin serum and other agents. He finds that serum heated to 72° C. loses its precipitating properties and also strongly inhibits the action of fresh precipitin serum subsequently added. In smaller quantities the heated serum merely lengthens the time required for the transformation of turbidity into flocculent precipitate. An excess of precipitable substance also prevents the formation of precipitum and rapidly dissolves it when formed. Any albuminous solution in considerable concentration inhibits the action of all precipitin sera.

ACTION OF CHEMICALS.—Many salts, as NaCl, $MgSO_4$ $(NH_4)_2SO_4$, have no deleterious action on precipitins, and are employed in their separation. Antiricin withstands the action of dilute H_2SO_4, and NaOH, at 37° C. for one-half hour, and is not altered by pepsin and trypsin (Jacoby), but Michaelis destroyed blood precipitin by digestion for one hour with pepsin and HCl, although each of these agents alone was inert. He also removed the calcium from the active serum by oxalic acid without affecting its activity. Pick in his comprehensive studies of typho-precipitin from the horse found it to be destroyed by digestion with pepsin or trypsin, by strong acidification, by urea, by a "few drops" of formalin, while the presence of a remnant of ammonium sulphate rendered the precipitated globulins inactive; the serum was less active in the presence of .8 per cent. salt than in some smaller proportions of salt, and calcium salts played little or no part in the reaction.

PRECIPITOIDS.—The spontaneous development or artificial production from precipitins of a substance devoid of precipitating powers, but still capable of chemical union with the precipitable molecule has been observed for many of the precipitins and these substances are called *precipitoids.*

According to Ehrlich's conception, they are the precipitins which have lost the zymophore group, while retaining the haptophore group, of the complex molecule. Their development and action are illustrated in experiments with lactose serum by P. Müller, who found that heated lactose serum, while itself no longer precipitating the albumins of milk, prevents the action of rennet and fresh lactose serum ,but if the coagulins are first removed heating does not cause the serum to develop the powers of an anti-coagulin.

CHANGES IN THE PRECIPITABLE SUBSTANCE AND THEIR EFFECTS.

The precipitable substance may be exposed to a great variety of influences, natural and artificial, without losing its susceptibility to the precipitin, which, however, is lost when the albuminous molecule is dissociated or loses its receptor for the precipitin.

EFFECTS OF HEAT.—Tschistovitch secured less precipitum in eel serum if heated to 58° C., and none after 80° C. Leclainche and Vallée found that heating albuminous urine two hours at 58° C., diminished its response to antiserum more than similar treatment of the antiserum itself. This somewhat anomalous result may perhaps be referred to the disturbing action of urea (cf. Pick). Nuttall concluded that blood precipitin and the precipitable substance are about equally resistent to heat, as dried serum heated one-half hour at 100° C. still reacted, while serum diluted 1 in 100 was unaffected at 55° C., but failed to react after heating to 100° C. Eisenberg was unable to destroy the reaction of dried bacterial precipitins or precipitable substance until the temperature reached 130 to 135° C., for one-half hour. Ferrai reports partial or complete loss of reaction from blood stains heated to 130° C. for one hour, 140° for twenty minutes, 150° for ten minutes, and 160° for five minutes. Biondi places the limit of resistance to heating of dried blood at above 130° C., finding some specimens to react after exposure to this temperature. Okamoto obtained distinct coagula from blood stains heated one-half hour at 50° and 100° C., but negative results with stains heated one hour to 150° C. Obermayer and Pick[2] find that beef serum heated to 60° or 70° C. not only fails to react to its antiserum, but also inhibits the action of pre-

cipitin upon fresh serum when added to that serum in certain proportions. Corin finds the precipitin reaction favored between temperatures of 37° and 50° C.

DRYING seems to preserve indefinitely the special properties of the precipitable albumins of blood, but not without some deterioration. Thus Ziemke secured a definite reaction from an extract of the stomach of a ten-year-old mummified cadaver, from dry stains two, nine, fifteen and twenty-five years old, from five-year-old stains on rusty knives, from an eight-year-old washed stain, and from blood one and three years in earth. Yet most of the old stains did not react strongly, yielding only turbidity without flocculent precipitate, and one ten years old, on a shirt, failed to react at all.

Uhlenhuth obtained a reaction (turbidity) in one minute with blood stains six to twelve years old, and Biondi secured definite reactions with stains one to fifteen years old, but failed with one twenty years old. Graham-Smith and Sanger obtained slight or marked turbidities in five to sixty minutes with nearly all of 29 stains three to thirty years old, from the Scotland Yard Museum, 17 of which came from knives which had been smeared with oil to prevent rusting. These authors found that fluid sera and egg albumin nine and fourteen months old had lost respectively 7 per cent. and 12 per cent. in precipitum, while one specimen of egg albumin nine months old had lost 33 per cent. Okamoto, 1903, obtained very feeble reactions from dried blood on wood and limestone dating from 1867, and 1874, but abundant precipitate from a dry blood clot preserved from a venesection in 1874. Some observers report reactions from decomposing blood, and from mixtures of several bloods. Uhlenhuth passed through the Berkefeld filter extracts in normal salt solution of several specimens of alkaline decomposing blood, from man and animals, and obtained reactions, prompt turbidity, only with corresponding antisera. Soapy washings of blood stains, urine, blood frozen two weeks, and carbonic oxide blood, all gave the same result. Ziemke secured reactions from recently decomposed blood and from a three-year-old decomposed cadaver. Graham-Smith and Sanger grew various putrefactive organisms thirty-six to fifty days in pleuritic exudate, beef serum, and horse serum, and found usually a decrease of precipitum from 20 to 50 per cent., but with some putrefactive species (unnamed), and in all the specimens of horse serum the precipitum was increased, once as much as 24 per cent. All were slightly alkaline or neutral in reaction, and control tests were negative. From Okamoto's experiments it must be concluded that the presence of ammonia in old or decomposing blood may prevent precipitation.

EFFECTS OF ACIDS ON THE PRECIPITABLE SUBSTANCE.—As the precipitum is soluble in rather weak acids and alkalis any great variation from a neutral reaction of the tested solution must be avoided. According to Linossier and Lemoine and Rostocki a slight acid reaction favors precipitation, while alkalinity hinders it. These observations accord with Pick's conclusion that the precipitum most resembles an alkali-albumin. Michaelis finds that human blood precipitum is soluble in dilute acids and alkalis and reprecipitated by neutralization. Graham-Smith and Sanger tested the action in .6-per-cent. salt solution of various acids, sulphuric, nitric, hydrochloric, acetic, oxalic, tartaric, carbolic, pitric, citric, salicylic and chinosol. All of these in dilutions up to and including 1 in 10,000, caused turbidities on addition of test serum, except carbolic and salicylic, which were without effect in dilutions of 1 in 1,000 and above. Some inorganic acids, however, caused very little clouding at 1 in 100, although more active both above and below this dilution. Strong alkalis were less uniform in action, caustic potash and soda caused turbidities in 1 to 1,000 dilution, while sodium carbonate and ammonia were inert at 1 in 10 and above, and were therefore available for neutralization of acid fluids. They found that small quantities of acid or alkali, especially of acid, diminished the quantity of precipitum. They concluded that it is necessary to test the reaction to litmus of all solutions of doubtful source and to neutralize if they are found decidedly acid or alkaline. In testing old blood stains from leather they found the solutions acid, except those from chamois leather, which were alkaline. Neutralization by sodium carbonate was therefore necessary before adding the serum. A thick, polished yellow leather gave a highly acid reaction, and no method of neutralization could be found which permitted the successful use of the test. The destruction of the precipitable substance was referable apparently to the tannin which in dilution of 1 in 1,000 clouds serum heavily. One of us was unable to obtain a specific reaction from human blood which had dried two months on shoes of a moderately cheap quality of red leather. All of the solutions of the stains in .6 per cent. salt gradually yielded spontaneously an abundant albuminous precipitate without the addition of any serum, and the decanted clear fluid continued to precipitate various sera subsequently added—probably from the presence of tannin. All the solutions were neutral to litmus. Okamoto also reports spontaneous precipitates from solutions of blood stains on leather. Since ammonia and phosphoric acid dissolve the precipitin (Uhlenhuth), the presence of these agents may prevent the reaction.

ACTION OF SALTS ON THE PRECIPITABLE SUBSTANCE.—In order to avoid spontaneous precipitation of albumins a certain proportion of salt must be present in the solvent, since solutions of blood in distilled water slowly become cloudy and deposit a sediment in twenty-four hours. Normal salt solution, .6 to .9 per cent., has proven the best solvent from which spontaneous precipitates rarely occur in twenty-four hours. Linoissier and Lemoine using 1 in 20 solution of blood report that 1 per cent. of salt gives precipitation, while

5 per cent. completely arrests it. On the contrary, Eisenberg and Rostocki find no difference in the quantity of precipitum when the proportion of salt reached 10 to 18 per cent. Graham-Smith and Sanger tested human blood solutions with increasing quantities of salt from .6 per cent. to saturation. At 1 per cent. the precipitum was slightly diminished (12 per cent.), at 2 per cent. of salt content almost the full amount was obtained; at 3 per cent. there was again a diminution, after which the precipitum increased until with saturation the precipitum reached 133.8 per cent. Very different results, however, were obtained with sheep serum. Beyond the fact that normal salt solution is the best diluent, present data do not, therefore, permit us to state rules regarding the influence of salt on the precipitin reaction. The same authors found turbidities to arise on the addition to tested fluids, of sodium and potassium tartrate 10 per cent., sodium acetate one per cent., potassium cyanide one per cent., borax one per cent.; while sodium citrate, magnesium sulphate, and potassium nitrate and chlorate, were inert.

ACTION OF EARTH ON BLOOD.—Several observers have secured positive reactions from blood mixed with earth, and the effects of such mixtures have been studied in detail by Graham-Smith and Sanger. They mixed equal quantities of human serum with detritus of chalk, red brick, Pasteur filter, Berkefeld filter, ordinary earth, white brick, mortar, and lime, one specimen of each being kept dry, and one wet, for four days, with the result that there was in all well marked diminution in the quantity of precipitum, average 20 to 30 per cent., while mortar and lime completely destroyed the precipitin substance. They found that the lime in ordinary earth precipitates test serum and must be removed by a current of CO_2 which does not interfere with the precipitin reaction, but that the lime of ordinary earth does not seriously affect the precipitable substance of blood mixed with it.

In this connection the writers may record a complete failure of many attempts to secure a reaction from human blood mixed for three months in earth containing much decomposing vegetable matter. Ziemke's results with certain specimens of blood mixed with earth, one to three years, must also be regarded as negative. Okamoto found that solutions of blood from sand and mortar sometimes gave spontaneous precipitates.

EFFECT OF ANTISEPTICS.—Carbolic acid or chloroform are commonly employed to inhibit bacterial growth in antisera and in tested fluids requiring observation longer than three hours. Yet each of these agents in concentrated form precipitates albumins from serum and gives turbidity if present in proportion of one per cent. or more. Under one per cent. they are inert. Graham-Smith and Sanger tested the action of several antiseptics. Mercuric bichloride and silver nitrate clouded serum at 1 in 10,000 dilution; copper sulphate at 1 in 100,000, formalin, thymol, benzol, toluol, xylol, and ether, at 1 in 100. Lysol and lysoform in high dilutions also produced turbidity.

RESULTS OBTAINED FROM BLOOD STAINS ON MISCELLANEOUS MATERIALS.—The writers obtained an abundant spurious reaction from blood stains on wall-paper. Controls made from unstained portions of the wall-paper gave abundant precipitates with different antisera, showing that the precipitation resulted from the action of some chemical in the paper. The solutions were neutral. Graham-Smith and Sanger report pronounced spurious reactions from ten samples of wall-paper.

They obtained good reactions from one thick blood stain on oak, but the test failed with minute stains on cedar and pine. Most observers have encountered no difficulty with stains on wood. One of us was unable to obtain satisfactory results from human blood stains on starched cuffs owing apparently to the presence of dissolved starch in the solution, which gave marked turbidity with various antisera.

SPONTANEOUS PRECIPITATES.—A short experience in the medicolegal use of precipitin sera will seldom fail to include the occurrence of spontaneous turbidities, and precipitates, in solutions prepared for testing. These are usually referable to the presence in the solution of chemicals contained in the material on which the blood is found. Okamoto observed such precipitates in solutions of blood stains on leather, sand and mortar. The writers have observed them in solutions of blood stains on shoe leather and shoe strings, and in one case in which vegetable albumins were dissolved from a rusty knife.

SPECIFICITY OF PRECIPITIN REACTIONS.

The first observations of workers dealing with sera of moderate potency and mixing the sera in indefinite proportions rather uniformly indicated that the reactions of precipitins were almost if not quite specific. Yet from the first a certain degree of similarity in the reactions of blood of closely related animals was observed. Bordet found his chicken precipitin to affect also pigeon blood, and Myers' chicken-egg precipitin was active with duck's egg, and his sheep globulin serum affected egg-albumin and ox-globulin. Uhlenhuth's potent hen's egg-albumin serum while active with pigeon egg-albumin, was entirely inert on other varieties of commercial albumins. Leclainche and Vallée found their serum obtained with albuminous urine precipitated human pleuritic exudate but not human blood serum or serum from the horse, donkey, sheep or beef.

Wassermann and Schutze declared in favor of the medicolegal value of the test, on finding that their humanized rabbit serum failed to appreciably affect any one of 23 different animal bloods, except that of the baboon, which reacted more slowly and incompletely than human blood. Stern also found that a humanized serum negative to horse, ox, sheep, and pig bloods, gave a feeble reaction with the blood of three species of

monkey. It soon became apparent that the more potent the serum the more pronounced, under the usual conditions is its effect on alien bloods. Chirokikh and Niedrigailow, using active humanized sera obtained precipitates, in the course of four to five hours, in all of several animal bloods tested.

Nolf's dog blood precipitin, Uhlenhuth's beef and humanized sera, and Wassermann's and Stern's humanized sera, were all reported to be specific for the blood used in the injections, but the exact dilutions were imperfectly stated. Uhlenhuth, not attempting to calibrate the serum, was unable to distinguish from each other the blood of the chicken, goose, duck, guinea-hen and pigeon.

Strube was among the first to point out the activity of humanized sera on other than human blood, finding that a powerful serum precipitating human blood in a dilution of 1 in 5,000 gave a precipitate also in monkey, guinea-pig, chicken, swine, calf, dog, pigeon, and sheep bloods. He speaks of instant turbidity occurring on the addition of this serum to chicken blood in proportion of 1 in 50. This is a very unusual experience. Using a more powerful humanized serum active in dilution of 1 in 20,000 (?) he found no reaction in a series of other animal bloods when the serum was diluted at least 1 in 100 and almost no trace at 1 in 10. He found that human blood was more actively precipitated by horse and beef antisera than by hog antiserum. He fails to state the exact details of these tests but the results were sufficient to point out the necessity of controlling the dilution of the test serum, and of determining by actual experiment what individual peculiarities each serum may exhibit.

Nuttall in an extensive study not yet completed has shown that the reactions with potent sera extend over closely related classes in the animal kingdom. Testing several antisera on the blood of over 500 animals of various classes he finds that a mammalian antiserum affects in varying degree the blood of nearly all mammals, but not without striking exceptions. Such sera however fail entirely to affect the blood of birds or reptiles. A reptilian or avian antiserum, while active in many birds and reptiles, fails to touch mammalian blood. Dealing with mammals he found that humanized antiserum was almost as active on the blood of the high monkeys, *Simiidæ*, as on human blood, less active with the *Cercopithecidæ*, very slightly with the *Hapalidæ* and *Cebidæ*.

Similar results were secured with Grünbaum's antichimpanzee serum. Antihorse serum precipitated the blood of eight species of *Canidæ*, but was entirely inert with 499 other bloods. Antibeef serum affected the blood of most ruminants. Antipig serum proved unusually diffuse in its effects, clouding the blood of man, monkey, marsupial, bat, and porpoise. Antifowl serum acted more or less on all avian bloods tested, but not on 357 other bloods. A powerful anti-egg serum affected slightly the blood of the alligator. Several reptilian antisera proved highly specific in their subclasses, that of the alligator affecting only the alligator and turtle, out of 500 bloods. Lobster antiserum precipitated lobster and crab blood only, from 503 bloods tested, and frog antiserum had no effect on 508 non-batrachian bloods.

It is important to note in reference to Nuttall's reports that "none of the reactions in heterologous bloods would ever be mistaken for a full reaction such as homologous blood gives." This statement does not apply to the reactions of humanized serum on the blood of higher monkeys.

The attempt to define a specific reaction must consider several factors entering into the reaction: (*a*) The potency of the serum; (*b*) the dilution of the serum; (*c*) the time elapsing; (*d*) the concentration of albumins in the tested fluid.

It has been shown that the more powerful the serum the wider is the scope of its action on the blood of related animals. Thus a feeble humanized rabbit serum in dilution of 1 to 5 may have no effect whatever on any but human and monkey bloods, while a very active humanized rabbit serum in the same dilution may precipitate the blood of several domestic animals. It might, at first sight, appear better, and has been formally recommended by Wasserman, to avoid the use of very potent sera in medicolegal work. On the contrary it has been fully demonstrated by Kister and Wolff, and in the experience of the writers, that the more powerful sera, permitting of rather high dilution, give much more reliable results than can be obtained by weaker sera less diluted. Overimmunized animals whose sera are relatively more potent with heterologous than with homologous blood are theoretically possible, but have not yet been observed.

If one compares the action of a weak serum precipitating human blood only in dilution of 1 in 15 and heterologous bloods in dilution of 1 in 1, with that of a powerful serum potent against human blood in dilution 1 in 200 but increased in activity on heterologous blood only up to 1 in 10, it will be seen that with the more potent serum the limits between dilutions precipitating human and heterologous bloods are very much greater than with the weaker serum, *i.e.*, as 190 is to 15. Hence the powerful serum may be safely diluted far beyond the point when it can affect heterologous bloods.

Moreover, it is only the more powerful sera which can be relied upon to cause precipitates with the minute quantities of blood frequently encountered in medicolegal work.

Nuttall has studied extensively the grades of reaction of various antisera on related animals and suggested a method of measuring the degree of reaction. This method involves the calibration of the test serum and tested blood and the estimation of the bulk of the precipitate formed after forty-eight to seventy-two hours, beyond which time the precipitin does not vary.

The detailed results thus obtained have not yet appeared, but Smith and Sanger describe the method as follows: By means of an accurately graduated pipette .5 c.c. of a 1 in 21 dilution of

serum in .6 per cent. salt solution is placed in a small clean dry test-tube, and .1 c.c. of antiserum added.

After thoroughly mixing, the specimen stands twenty-four hours when the precipitum settles. The supernatant fluid is pipetted off and the precipitum drawn into a capillary tube which is sealed and allowed to stand for seventy-two hours.

The bulk of the precipitum is then read from the tube which is graduated in cubic centimeters. The average quantities of precipitum obtained by adding their antisera to human and beef blood in the above preparations were .0293 c.c. for the human blood and .0233 c.c. for the beef blood. This method is not claimed to escape errors of less than 10 per cent., arising mainly from variations in the quality of the precipitum. It is specially adapted to experimental studies and measuring of blood relations among animal species but does not appear fortunately adapted for medicolegal work.

Kister and Wolff have very clearly shown that by proper dilution of the test-serum, reactions in heterologous blood may be avoided. Working with horse precipitin from the rabbit, they found that when the test serum was added in proportion of 1 in 5 to solutions of serum diluted 1 in 10 or up to 1 in 320, instant turbidity appeared in sheep, human, beef, and swine blood, as well as in horse blood. When the test serum was diluted 1 in 50, although turbidities formed in one of the above heterologous bloods, no flocculi appeared in two hours, except in horse blood, which gave a flocculent precipitate in thirty minutes. With dilutions of test serum 1 in 100 the heterologous bloods failed to react except by very faint turbidity, while in horse blood the reaction was but slightly diminished. Sheep precipitin from the rabbit failed to effect human blood in any dilution. Throughout their experiments the most distinct turbidities usually appeared in the more concentrated solutions of blood but usually the turbidities became flocculent first in the weaker solutions of blood.

The writers have tested various antisera with a view to determine under what conditions the reactions in heterologous bloods may be avoided, and without danger of error from the personal equation in judging the reaction. The action was first tested of normal rabbit serum, added in proportion of 1 in 1 to fresh serum of man, beef, sheep, goat, horse, rabbit, dog, cat, and chicken, diluted 1 in 10, 1 in 50, and 1 in 100. Faint turbidities were sometimes produced, but none of these were pronounced and none became flocculent

TABLE I.

ACTION OF HUMANIZED RABBIT SERUM.

Human						Beef					Sheep					Goat					Horse					Dog					Cat				
Blood dilution	10	50	100	200	500	10	50	100	200	500	10	50	100	200	500	10	50	100	200	500	10	50	100	200	500	10	50	100	200	500	10	50	100	200	500
Time / Serum 1-5																																			
10 minutes	T	T	T	T	T	T	T	T	T	o	T	T	o	o	o	T	T	T	o	o	o	o	o	o	o	o					o				
30 minutes	T	T	T	T	T	T	T	T	T	o	T	T	T	o	o	T	T	T	T	o	T	o	o	o	o	o					o				
60 minutes	F	F	T	T	T	T	T	T	T	o	T	T	T	o	o	T	T	T	T	o	T	T	o	o	o	o					o				
2 hours	F	F	F	T	T	T	T	T	T	o	T	T	T	o	o	T	T	T	T	o	T	T	o	o	o	o					o				
3 hours	F	F	F	F	F	F	T	T	T	o	T	T	T	o	o	T	T	T	T	o	T	T	o	o	o	o					o				
Time / Serum 1-10																																			
10 minutes	T	T	T	T	T	T	T	T	T	o	T	T	o	o	o	T	T	T	o	o	o	o	o	o	o	o					o				
30 minutes	T	T	T	T	T	T	T	T	T	o	T	T	T	o	o	T	T	T	o	o	o	o	o	o	o	o					o				
60 minutes	F	F	T	T	T	T	T	T	T	o	T	T	T	o	o	T	T	T	o	o	T	o	o	o	o	o					o				
2 hours	F	F	F	T	T	T	T	T	T	o	T	T	T	o	o	T	T	T	o	o	T	T	o	o	o	o					o				
3 hours	F	F	F	F	T	T	T	T	T	o	T	T	T	o	o	T	T	T	o	o	T	T	T	o	o	o					o				
Time / Serum 1-20																																			
10 minutes	T	T	T	T	T	T	T	o	o	o	o	T	o	o	o	o	o	o	o	o	o	o	o	o	o	o					o				
30 minutes	T	F	F	T	T	T	T	T	o	o	o	T	T	o	o	o	o	o	o	o	o	o	o	o	o	o					o				
60 minutes	F	F	F	T	T	T	T	T	o	o	T	T	T	o	o	T	T	T	o	o	T	o	o	o	o	o					o				
2 hours	F	F	F	T	T	T	T	T	o	o	T	T	T	o	o	T	T	T	o	o	T	T	T	o	o	o					o				
3 hours	F	F	F	F	T	T	T	T	o	o	T	T	T	o	o	T	T	T	o	o	T	T	T	o	o	o					o				
Time / Serum 1-30																																			
10 minutes	T	T	T	T	T	T	T	o	o	o	o	T	T	o	o	o	o	o	o	o	o														
30 minutes	T	T	T	T	T	T	T	o	o	o	o	T	T	o	o	o	o	o	o	o	o														
60 minutes	F	F	T	T	T	T	T	o	o	o	o	T	T	o	o	o	T	T	o	o	o														
2 hours	F	F	F	T	T	T	T	o	o	o	o	T	T	o	o	o	T	T	o	o	o														
3 hours	F	F	F	F	T	T	T	o	o	o	o	T	T	o	o	o	T	T	o	o	o														
Time / Serum 1-50																																			
10 minutes	T	T	T	o	o	o	o	o	o	o	o	o	o	o	o	o																			
30 minutes	T	T	T	T	T	o	o	o	o	o	o					o																			
60 minutes	T	T	T	T	T	o	o	o	o	o	o					o																			
2 hours	T	F	T	T	T	o	o	o	o	o	o					o																			
3 hours	F	F	F	T	T	o	o	o	o	o	o					o																			

T, turbidity; F, flocculi.

until bacteria developed. Four humanized rabbit sera were then tested on the same bloods diluted from 1 in 10 to 1 in 500. The most active of these sera caused a flocculent precipitate in two hours, in human blood diluted 1 in 100 when added in the proportion of 1 in 200. The others were slightly less active. The results with these four sera varied considerably, some proving more specific than others. When diluted less than 1 in 30 all of the sera occasionally produced turbidities in heterologous bloods. These turbidities were usually slight and none of them obtained by dilution of test-serum 1 in 30 became flocculent in three hours, while all of them caused flocculent precipitates in three hours in human blood without regard to the dilution of this blood, when added in dilution 1 in 30 or even 1 in 100. It thus appeared that in order to obtain a specific reaction for human blood free from danger of error from the personal equation, one had to dilute these antisera at least 1 in 30, and require a distinct flocculent precipitate within three hours at 37° C. (See Table I.)

(To be Continued.)

A STUDY OF IMMUNITY. EHRLICH'S SIDE-CHAIN THEORY.*

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MODERN pathology has taught us that in the consideration of disease we are not dealing with diseased organs, but rather with diseased cells; and as the cell is the center of the pathological condition, so is it the center of the bodily defenses, and we might say that as a chain is no stronger than the individual links which compose it, so is an organism no stronger than its individual cells.

Health is that condition in which the various body cells are acting and reacting in such a manner that the various structures and organs are able to perform the work which nature has assigned to them. Not only are these cells endowed with the power to do work, but they also possess the power of defending the organism against harm from foreign influences.

Suppose the organism is attacked by a species of foreign cell such as the causative element of smallpox, the body cells begin at once to oppose its ingress, and in many instances are able to bring the disease to a standstill. In such cases we say the patient recovers. Not only does he recover, but he carries with him a peculiar condition which protects him from another attack of the same disease. This has been termed immunity. In its wider sense, immunity means a protection of the organism from any toxic substance.

Immunity has been recognized for ages, but its complete explanation is still to be found. Not only has it been noted that those who recover from certain diseases possess immunity, but also that certain persons who never had them seem likewise to be immune. Certain individuals will pass through an epidemic and remain well when all of their associates become ill. Certain species of animals will remain well while other species are dying of some infectious disease. An example of this is found in the ordinary field mouse, which is insusceptible to septicemia, while the house mouse is very susceptible. So we have two kinds of immunity, natural and acquired; natural depending upon an innate property of the cells of the organism which protects it from disease and acquired, depending upon a certain condition artificially produced.

Now let us inquire, What is it that causes immunity? What is it that takes place when an individual who was formerly susceptible to a given disease suddenly manifests a resistance toward it? What is it that makes one animal or species of animal susceptible to a given disease when another is insusceptible?

These are questions that have puzzled scientists for ages, and they have called out many answers to account for them. Metschnikoff has attributed to the phagocytes the power of defending the organism against disease; Buchner, to the germicidal properties of the blood aside from its cellular elements; others have thought it due to the using up of a necessary pabulum. When, in 1890, it was shown by Behring that immunity to a given disease could be artificially produced by the introduction into an animal of a serum taken from another animal which had been previously subjected to increasing doses of the cultures of the germ causing the disease, all previous notions of immunity had to be changed, and the first hint as to its true nature was obtained—it must be something associated with the action of the germ or its toxin upon the living host.

While working to standardize diphtheria antitoxin Ehrlich made several important observations which finally led to the enunciation of his side-chain theory. Among other important observations he noticed that toxin and antitoxin combine in definite proportions, that this combination is hastened by heat and retarded by cold, and that it takes place more quickly in a concentrated than in a weak solution. These very suggestive facts showed this action between toxin and antitoxin to be very much like other chemical reactions; and, by further study and experiment, Ehrlich was able to formulate his theory, which up to the present time accounts more satisfactorily than any other for the phenomena of immunity.

The production of immunizing substances depends upon the established fact that the body when in a state of health will produce substances which are antagonistic to alien cells and cell products. The manner in which this is done has been explained in a very plausible manner by Ehrlich.

He conceives of the body cells as consisting of a central nucleus and a number of side-chains or receptors. These side-chains possess certain affinities which are satisfied by or correspond to certain side-chains of cells, which are introduced from without the organism. These side-chains

* Read at the Thirty-first Regular Semiannual Meeting of the Southern California Medical Society, Avalon, Santa Catalina, Cal., June 3 and 4, 1903.

have to do normally with the nutrition of the organism, the food material being taken up by its combination with the side-chains of the cell. When a poisonous effect is produced upon the organism, it likewise must be produced by a combination being formed between it and some of these side-chains. It is not conceivable that nature has endowed the cells of the organism with special side-chains for poisonous materials, but rather that these poisons are capable of forming unions with some of those which are normally intended to seize upon nourishing particles.

There is a physiological law according to which protoplasm when injured tends to restore itself, and in the matter of cells, not only compensation but hypercompensation is the rule. Now, when a poison has fastened itself upon a cell through its side-chains, what happens depends upon the degree of toxicity. If the action of the poison is severe, death of the cell and perhaps the organism is the result; if slight, the cell is only slightly injured and tends at once to reproduce the injured side-chains. Not only enough are produced to replace the injured ones, but a greater superabundance of them is likely to be produced, which are cast off into the blood and lymph stream. These side-chains floating in the blood stream retain their affinity for the poison which caused them to be formed as though they were still fastened to the cell, hence they combine with the poison and prevent it from combining with the side-chains which are still fastened to and a part of the cell. These are the antitoxin. As has been so tersely put by Behring: "The same substance which, when incorporated in the cells of the living body, is the prerequisite and condition for an intoxication and becomes the means of cure when it exists in the circulating blood."

According to this view the cells of an animal possessed of natural immunity to a given poison possess no side-chains with which the side-chains of the poisonous molecule can combine; thus the cells of the field mouse, as mentioned above, have no side-chains which possess an affinity for the side-chains of the poisonous molecule present in septicemia, and if an antitoxic serum were discovered for septicemia it could not be made from the field mouse.

Aside from the natural and acquired immunity we also have active and passive immunity. These may both be illustrated in the production and use of diphtheria antitoxin. Active immunity is that which is produced by subjecting an organism to doses of cultures of the bacillus in which the organism produces its own antitoxin. Passive immunity, on the other hand, is that which is produced by introducing into the organism an antitoxin already formed. Thus when a horse is subjected to increasing doses of diphtheria cultures, the receptors or side-chains of the cells are injured, and in Nature's efforts to restore them she forms many more than are necessary, which are cast off into the blood and lymph stream as antitoxin. This is active immunity. Now, when this serum is taken from the horse and injected into the human being it carries with it the receptors or side-chains of the horse and so passively immunizes its recipient.

When the anti-toxin for diphtheria and tetanus were discovered it was thought that the final solution to the prevention and cure of all infectious disease was at hand; but later studies showed this to be not the final solution but only the first hint. It was found that the different micro-organisms of disease produce their deleterious effects in different ways. While in diphtheria and tetanus the toxic substance is soluble and the main cause of the poisonous symptoms in other diseases, such as tuberculosis and leprosy, this is not the case, and the action seems to be largely mechanical. Also in septicemia the cause of the symptoms is not the toxin so much as the germs themselves. This dissimilarity in the causative factors of infectious diseases overthrew the hope of reducing the cure of infectious diseases to the finding of anti-toxins.

At this juncture, when hopes seemed low as regards the discovering of any great number of antitoxins, a very important discovery was made by R. Pfeiffer. He noticed that if cholera bacteria are placed in the peritoneal cavity of an animal which has been previously immunized to cholera, the bacterial cells are dissolved by the peritoneal fluid. Further investigation showed this action to be specific, and that those bacteria only are dissolved to whose action the animal has been immunized. This has been denominated Pfeiffer's phenomenon and the action is known as bacteriolysis.

It was shown that immunity was not only produced by antitoxins but also by bacteriolysis. In searching for the explanation of this phenomenon it was found that it could be explained by Ehrlich's side-chain theory, although the process was much more complex than that of immunity by antitoxin.

Pfeiffer's phenomenon does not only take place when bacteria are introduced, but when any foreign cell is introduced. It seems possible to immunize the body against all cells. Thus blood, spermatozoa, the cells of the various organs have been able to produce, when introduced into the organism, a specific immunizing serum whose lytic action is limited to the definite cell which caused it to be formed. The blood of a goat inoculated into a horse will produce in the horse a serum which will dissolve the corpulscles of a goat; by the gradual inoculation of an animal with spermatozoa a serum has been produced which will kill spermatozoa; and by the inoculation with cells from the liver and kidney sera have been produced which have a tendency to cause degenerative action in these organs. So it seems that there is no end to this matter of cytolysis, as this process is called. It has been suggested that it might be possible to cause the destruction of tumors by forming a specific serum which would cause their disintegration. It may seem Utopian, but it is not beyond reason to hope that there will soon be made in the biological laboratory a specific serum for each of the infectious diseases.

To produce lysis it has been found that two bodies are necessary in the serum. One of these is destroyed by a heat of 56° and the other is not affected thereby. The substance which is destroyed by a heat of 56° is found in normal serum and has been named differently by different authors, thus: addiment, alexine, complement and cytase. The other substance which is produced at the time of immunization has been given so many names by different investigators that it is necessary for one to know them all or he will be misled. Thus, immune body, intermediary body, amboceptor, fixitive, sensitizer, preparative and desmon have all been invented to describe this one body.

Sera, whose action depend upon bacteriolysis, deteriorate with age owing to the complement being unstable. This can be again supplied and the serum reactivated by the addition of fresh serum, even though it be taken from a non-immunized animal. This deterioration of the complement may account for disappointment at times in the use of sera in treatment of disease.

In the production of immunity we have not only the formation of antitoxins and bacteriolysins, but also other products which seem to be directed against other properties of the invader than those opposed by these. Such are the agglutinins, precipitins and coagulins, the study of which would lead me farther than I wish to go at this time.

I recognize the difficulty in presenting this subject in a simple manner, for it deals with new ideas which are described in a strange terminology; but let the importance of the subject be my apology. It is necessary for every clinician to be conversant with the new theories of immunity, for it is to the laboratory that we must look for our treatment of specific infectious diseases in the future. Already we have diphtheria antitoxin, which has reduced the mortality of this disease by about 25 per cent. Tetanus antitoxin has been of value in some cases. Antistreptococcic serum has been a delight to some and a disappointment to others. The immunizing against plague seems to be established. Serum treatment of pneumonia and typhoid fever offer hope. The treatment of tuberculosis by the various immunizing preparations which have been made from the bacillus is fast gaining ground and eminently successful in the hands of careful men. It is not sufficient to name these sera and say that because there have been more failures than successes that they are of no value. Far from it. They are precursors of something better. Their partial failures will bring success, and out of this chaos of blighted hopes will come order.

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REPORT OF A CASE OF ACUTE GLAUCOMA INCITED BY THE USE OF EUPHTHALMINE FOR DIAGNOSTIC PURPOSES.*

BY HENRY W. RING, A.M., M.D.,
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EUPHTHALMINE hydrochlorate, a synthetic product said to resemble closely eucaine "B," was brought to the attention of ophthalmologists by B. Treutler in 1897. He found it to be a strong mydriatic, brief in its action, and producing no unpleasant effects.

The invention of a mydriatic having a rapid and brief action without in any way affecting the power of accommodation is still a desideratum to be realized but it was thought euphthalmine might be the drug *par excellence* for this purpose and extensive and varied experimentation resulted.

Treutler's own experimental results were summarized as follows, viz.:

1. The instillation of euphthalmine solutions into the eye causes only very slight and temporary inconvenience.

2. Euphthalmine is a powerful mydriatic. A 5- to 10-per-cent. solution produces a maximum dilatation of the pupil in about the same time as does 1-per-cent. homatropine solution.

3. Its action is less intense and prompt in the aged than it is in younger individuals.

4. Euphthalmine has the advantages over cocaine as a mydriatic that it is more powerful in its action, and that it does not damage the corneal epithelium. On the other hand, the mydriasis that it occasions is somewhat slower of development.

5. Euphthalmine affects accommodation less than does homatropine.

6. Both the mydriasis and the accommodation paralysis disappear much more quickly after its use than after that of homatropine.

7. No unpleasant effects upon the organism have so far been observed from its use.

His observations were confirmed in the main by Ball, Schneider, Vossius, Winselmann, Vinci, Woskessensky and Darier during 1898 and since that time I presume there are few ophthalmologists who have not used the drug enough to form their own conclusions as to its limitations and value.

Knapp, in 1899, after nine months' use, was very favorably impressed with it as an aid in ophthalmoscopical examinations.

In two cases he received the impression that "euphthalmine, like atropine, had a tendency to increase the eyeball tension. In many later cases had not seen this effect any more."

In the same year Jackson wrote "the claim that euphthalmine is free from danger of causing glaucoma, should be met with skepticism. The claim has been put forward for duboisine, and homatropine, and has for them proven false. No one has yet reported a glaucomatous attack fol-

*Read at the Annual Meeting of the American Ophthalmological Society, Washington, D. C., May 13, 1903.

lowing the use of euphthalmine; but the report will undoubtedly come later, if the drug is widely used. It has this advantage over the stronger mydriatics, that the brief mydriasis that it produces may not so often last long enough to develop increased ocular tension. But its mode of action seems quite similar to that of atropine and homatropine; and it is possible that the relatively greater mydriasis it produces, as compared with the cycloplegia, may be fraught with correspondingly greater danger. At any rate, without wide and prolonged experience with it, we are not justified in ranking euphthalmine with cocaine as a comparatively safe mydriatic to use in cases of impending glaucoma."

In the *Ophthalmic Record* for May, 1902, Dr. Myles Standish reports a compilation of 32 cases of glaucoma reported to the New England Ophthalmological Society since its foundation. In an analysis of these reports he found that glaucoma was precipitated in nine cases by atropine, two cases by homatropine, and one case by cocaine, one case by scopolamine, and one case by duboisine—an array, which to his mind, tends to establish the fact that it is the mydriasis itself, and not the drug used, which produces the disastrous result.

Of these 14 cases 12 were caused by the use of mydriatics alone and he is of the opinion that, "in a person over forty years of age, when the pupil is dilated for the purpose of examining the fundus or refraction, the instillation of a myotic before the patient leaves the office, as a matter of routine, would, in all probability, prevent the supervention of acute glaucoma in cases predisposed thereto."

Previous to the introduction of euphthalmine it was my habit to use cocaine to dilate the pupil for diagnostic purposes. My patients did not like the sensation of stiffness of the eyeball and lids caused by its use but this was of minor consequence. A not at all infrequent cause of complaint, however, was a more or less serious interference with the accommodation, and where the accommodation was practically abolished by age, with the general near vision. The time of the visual disturbance ranged from six to twenty-four hours.

During the past three or four years I have entirely displaced cocaine by euphthalmine for simple dilatation of the pupil, using a 5-per-cent. solution, and I simply know that I have little or no complaint from patients as to any prolonged disturbance of vision.

I have never assumed that the drug was not capable of causing increased tension and possibly exciting a glaucomatous attack in an eye predisposed thereto and therefore have made it a custom before using it in a patient beyond middle life, to take the tension of the eyeball, examine the eye by oblique illumination and make some inquiries as to glaucomatous symptoms. I have never had occasion to regret its use but in one instance and the history of that case was as follows: Feb. 14, 1902, Mrs. H., residing in a near-by town was sent to me by her family physician. She was a well-to-do housewife, aged fifty-six years. At the age of eight years she was very ill with rheumatism followed by erysipelas and since then has never been in vigorous health. Attacks of articular rheumatism have been common but there is no marked enlargement of the joints. Headaches in the frontal and occipital region have been a source of affliction many years. In the autumn of 1901 she began to have periods of pain in the left eye and supra-orbital region and these attacks had been increasing in frequency and severity and when an acute stage was reached the vision of this eye was so much reduced that she avers her inability to distinguish objects. The eye would be mildly congested and she could get relief from hot applications and anodynes, after which the usual sight would be restored. Recently these attacks had become so frequent and severe that her physician wanted my opinion as to the condition of the eye. He had assumed up to this time that the eye pain was an exhibition of her general neuralgic and rheumatic condition.

I first took her refraction which was O. D. $\frac{20}{70}; \frac{20}{20} - +1.0 = +.5$ ax. O.; O. S. $\frac{20}{70}; \frac{20}{20} - +1.0 = +.5$ ax. O. She read J.1 with each eye with $+4.5 = -.5$ ax. V.

Macroscopically the eyes seemed normal and after finding the tension and field (taken roughly) the same, I instilled two drops of 5-per-cent. euphthalmine solution into the left eye, as the pupil was small and I felt the necessity of a thorough examination of the interior of the eye. In about a half hour the pupil was well dilated and the ophthalmoscope revealed no abnormal condition sufficient to account for her pain. The outlines of the nerve seemed a trifle hazy and there was a single spot of retinal exudation near the papilla at the nasal side.

I gave her correction for distance as she had not been wearing any, changed her reading glasses slightly, ordered phospho-nux and asked her to let me see her, if possible, while she was in the midst of another attack.

I did not see her until fourteen days later and the history of the case during that time was furnished by the patient. Within a few hours after she left my office there was a renewal of the pain in the eye and the left side of the head and during the next two weeks she had but few intervals of relief except when under the influence of opiates.

The eye soon became inflamed and tender and the vision much impaired. She was so weak and prostrated that she did not feel able to come to my office until Feb. 28, when I found a typical case of acute glaucoma.

Vision reduced to distinguishing objects T + 1½, eyeball injected and tender, cornea dull and anesthetic, anterior chamber shallow, pupil dilated and fixed, no view of fundus possible. The right eye was not involved.

Within four hours I did an iridectomy, ether being used as an anesthetic. The iris was very rotten and I was obliged to pick it out in strands. After this operation she was comparatively free from pain for the first time since the instillation of euphthalmine.

I used eserine in the good eye the day of the operation and several succeeding days. March 5 the tension was normal, field of vision (not taken by the perimeter) very good, eye white and quiet and vision very fair, but I have no exact record of it. She went to her home and returned to me on March 15. There had been no recurrence of trouble and I found T.n. media clear, only slight cupping of disc V.L.E. $\frac{20}{50} + \frac{20}{20} - + 1.12 = -1.0$ ax. V. and reads J.2. with $+ 4.0 = -1.0$ ax. V.

During the next four months she would have occasional shooting pains through the left eye and the head but only such as she had been having for two years or more. She had rarely seen halos and the field in each eye was little if any impaired. She was disturbed about the possibility of the disease attacking the good eye and July 2 she elected to have an iridectomy on the right, which I did, using cocaine as an anesthetic.

She has had a very comfortable winter and her vision is normal with correcting lenses. The eyes are free from tension, cupping of the discs or pulsating veins.

CIRCULAR LACERATION OF THE CERVIX UTERI.*

BY HUGH CROUSE, M.D.,

OF VICTORIA, TEXAS.

THE parous cervix nearly always shows some signs of laceration. The degree varies from the mere indentation, to a deep tear, extending to or into the vaginal insertion; the type, from unilateral, bilateral or stellate, to a circular separation of the cervical tissue. In meeting the first of the two subsequent circular lacerations I am about to describe I was totally astonished when specular examination acquainted me with the condition present. The symptoms of cervical lacerations are mainly objective, but subjective indications may be present when a post-partum hemorrhage of an extent inducing collapse exists, despite a properly retracted uterus. The treatment varies, according to the degree, from a passive inattention, to the modern method of immediate repair. The friable condition of the uterine tissues immediately after delivery, I have found diffident to retain sutures sufficiently contracting in their efforts to obtain a fair apposition of the parts; but yet such an effort should be made. Literature upon the usual types, their nervous sequelæ and treatment is appalling in its quantity; upon the circular form the greatest paucity exists. In fact, to such an extent is literature barren upon circular laceration that I have hesitated to report the two cases noted. The thin-rimmed os of a slow labor offers to the rough or hasty accoucheur the best of chances for laceration, but, yet, the scar-marked cervix presenting its resisting cicatricial tissue to the presenting part, and natural expelling forces, gives its quota of laceration in the multipara. Case No. 2 is one resulting from, in my opinion, excessive scar tissue left in the closure of the wound made in a vaginal myomectomy, done at the fourth month. Case No. 1 resulted from the external force, backed by the proverbial ignorance of a colored midwife, who mistook a pendant cervix, after a twin delivery, in a thirty-six-year-old VI-para colored woman in whom but a single placenta existed, for a second afterbirth. Her chain of reasoning led her to believe that where two children were there needs must be a dual placenta. Strenuously she strove, digging and gouging, though plainly found (so the history given the attending physician and I, the counsel) no second placenta could be delivered. One of my colleagues had been called but failed to deliver. On being invited into the case a careful examination showed an empty uteri, except for clots. A peculiar ribbon of tissue was united, to the extent of half an inch at both ends, to the cervix (an incomplete band, as it were) presented itself. With proper light and instruments the parts were exposed and the condition readily shown to be a circular laceration of the cervix. Ten hours had intervened since delivery of the second child, and, as a result of the dragging, which the band had been subjected to, the parts between attached ends were black and devitalized. The band was removed by means of scissors, the edges sterilized and antiseptic douches ordered twice a day with good results.

Case II.—Mrs. F., white, aged thirty years; III-para; had a quick normal delivery, the three stages occupying four hours. A rather free hemorrhage after placental delivery, despite a well-contracted uterus, led to an investigation of the cervix. The posterior lip of the cervix was found to have a circular tear involving nearly half of the circumference, the breadth of separated tissue being about one-half inch. The part seemed well supplied with blood, hemorrhage lessening of its own accord rapidly, so a rather snug iodoform gauze packing was applied and the nurse warned to note carefully the flow. Twelve hours later the gauze was removed and 1 in 10,000 bichloride douche ordered twice a day with good results. In this case a vaginal myomectomy had been successfully performed at the fourth month. No doubt the cicatricial tissue had been caught through its excessive resistance to natural forces, and separation had been induced by some presenting part. The presentation was left occipito-anterior. These two cases have been presented on account of the rarity of circular laceration. They are instructive from their uniqueness alone.

* Read before the Obstetrical Section of the Texas State Medical Association, at San Antonio, Texas, April, 1903. Dr. J. F. Y. Paine, Professor of Gynecology in the University of Texas, Galveston, and Dr. Cantrell, of Greenville, Texas, reported similar cases in the Discussions.

MEDICAL PROGRESS.

MEDICINE.

Addison's Disease.—The patient, a young man of twenty-one years whose father was a pronounced drunkard, noticed one year before he was admitted to the hospital, slight discolorations around the knee-joints which in the course of some weeks also appeared on the face. At the same time he lost strength, and the pigmentation began to involve gradually various parts of the body. To the general weakness there supervened dizziness, at times faintness of such a pronounced character that patient was compelled to apply for admission to the hospital. In addition to this diarrhea, then constipation, lack of appetite, nausea, and at times troublesome palpitation. Patient left hospital in nine days somewhat improved, but was compelled to return in less than two months in a worse state than he left, while the pigmentation had by this time spread over a greater area of the body. The pigmentation gradually took on a bronze color and invaded the neck, the region of the scapulæ, especially over the bony prominences, the chest, the gluteal region and the perineum, as well as the sexual organs; then the extremities and the rest of the body, more or less. The striking feature of the affection was the patient's extreme debility, so that he was hardly able to move about. Lungs normal; examination of the heart elicits a distinct anemic murmur, otherwise normal; pulse small and soft, but not quite regular. Examination of blood gave about 4,000,000 red corpuscles, 15,000 white, 60 per cent. hemoglobin; no poikilocytosis of red corpuscles; number of white markedly increased, and among them many multinuclear neutrophiles, and an increase in the plates of Bizzozero. The temperature of the body was at times subnormal. After a two month's stay in the hospital patient was discharged very much improved, though with a loss of some 8 to 10 pounds in weight. N. N. DARKSCHEVICH (Roussky Vrach, No. 33, 1903) does not doubt that this was a case of Addison's disease, the more so as the patient's mother died of tuberculosis, and he himself suffered in his youth from a tuberculous joint disease. To determine the nature of the pigmentation, small pieces of the skin were excised, with the patient's consent, and their microscopical examination showed an accumulation of pigment in the lower stratum of the skin, mostly around the capillaries, while the epithelial cells are filled with some seed-like bodies which evidently contain the discoloration. In the treatment of the case adrenalin (the hydrochlorate) was administered twice and three times a day, in doses of 5 to 10 drops. The only marked benefit was evidenced by the increase in the secretion of urine; later on, however, the pulse also began to improve, and there was a noticeable diminution in the pigmentation, and improvement in the general condition. Unfortunately the patient insisted on leaving the hospital, and both the treatment and the observation of the case had to be discontinued.

Vegetarian Diet in Gout and Nephritis.—In a dietary intended for patients of this class, meat, especially of the red varieties, is excluded on account of the large amount of extractives which it contains. Vegetables are given, however, in large variety. J. W. HALL (Berl. klin. Woch., 1903, No. 38) has shown by chemical analysis that the purin contents of the ordinary vegetables varies within large limits. White bread, rice, tapioca, lettuce, cauliflower and potatoes come within the limits of safety, but peas, beans, oats, onions and asparagus are among those which should be avoided. Malt liquors also show a large percentage of purin bodies and should be forbidden.

Delicacy of the Tests for Iodine.—The demonstration of iodine in the urine and other body fluids is not only of value for the diagnosis of poisoning, but also for the diagnosis of the functional activity of the stomach as regards absorption and motility, and of the excretory power of the kidneys. A large number of tests have been devised for the purpose of demonstrating the presence of the drug and all of them have been made the subject of comparative tests for determining their individual delicacy by E. ROGOVIN (Berl. klin. Woch., 1903, No. 38). Urine and transudates from patients convalescing from angina and rheumatism and in whom potassium iodide formed the only medication, was subjected to all of the tests. Observation showed that in the majority of cases after 0.005, and sometimes even 0.002 to 0.003 given by mouth, iodine could be demonstrated in the urine. The most sensitive tests were those of Hartnack, using nitric or sulphuric acids, and chloroform or benzine, or those in combination with starch solution. By these, 0.002 of KI given by mouth could be detected as iodine in 700 c.c. of urine. All other tests proved negative with these quantities. Next in value is the method of Sandland, by which, after giving 0.00765 mgr. of KI, iodine could be detected in the urine.

Relation of Cyclic Albuminuria to the Circulation.—Observations in support of this theory have lately been advanced by P. MORITZ (Deut. med. Woch., No. 37, 1903). He believes that this form of albuminuria is due to some insufficiency of the circulatory apparatus, for he noticed that the increased blood pressure which normally occurs after exercise of a moderate degree, was followed by abnormally low pressure in those persons who were inclined to display a tendency toward cyclical albuminuria. He made some practical tests in two patients of this type, by requiring them to lie down and then artificially inducing a disturbance of respiration by calling on them for straining efforts for ten or fifteen minutes, similar to those at stool. This was invariably followed by the appearance of albumin in the urine, although none had been present before. His treatment of cyclical albuminuria is therefore based on these measures and consists of tonics for the heart muscles and its nerves. He does not resort to rest cures, as advocated by others, and also believes that there are prospects of treating chronic nephritis in a similar manner by gymnastic therapy. A point emphasized is that the albuminuria does not come on during the increased blood pressure and respiration that accompany physical exercise, but only during the stage of lowered pressure which follows this period. The value of diuretics in these cases is due to the improved circulation through the kidneys which they produce. He draws a comparison between this form of albuminuria and convalescence from an infectious disease, except that in the former case the condition is permanent and the patient is practically a chronic convalescent.

A New Test for Albumin in the Urine.—The 40-per-cent. aqueous solution of formaldehyde, sold under the name of formalin, will precipitate serum-albumin and serum-globulin from solutions; but it produces only a slight turbidity in the presence of egg-albumin, according to N. INTRONA (Gazz. Osped., Sept. 13, 1903). He has used the substance in testing urine for albumin in the following manner: A half dram of formalin was added to 2½ drams of albuminous urine; the test-tube inverted several times, and then allowed to stand. The urine became at once clouded and a flocculent precipitate appeared, which settled to the bottom within a few hours. This precipitate reacted to tests for albumin. For the purpose of comparison with the usual albumin test by means of ebullition and acetic acid, the author tested 1½ drams of albuminous urine by this method and boiled a like quantity of the same urine, and to it added a quarter of a dram of formalin; a test-tube of the same size being used for both tests. The

coagulum which formed in the second tube was found to be two inches higher than that in the first. A further proof of the greater delicacy of the formalin test was found in the fact that after filtration of the specimen, which had been tested by boiling and addition of acetic acid, the filtrate showed a distinct trace of albumin upon heating and addition of formalin. The latter may also be used for the quantitative analysis of albuminous urine, but the procedure, as described by the author, is much more complicated than Esbach's method.

Dyspeptic Albuminuria.—Though this affection is of frequent occurrence, its diagnosis is always difficult, and should never be positively made till the case has been watched for some time, says M. BUREAI (Gaz. Méd. de Nantes, Sept. 12, 1903). Its characteristics are described as follows: The quantity of albumin is not abundant, rarely exceeding 0.50 per liter, and is not accompanied by any increase in the amount of urine passed during the twenty-four hours. Its presence is not always constant, in which case it is absent from the morning urine passed in the fasting state. It appears or is increased after meals, and is composed solely of serin; globulin being entirely absent. Casts are never found. A certain amount of indican is present in such urine, and the earthy phosphates are in excess. No other abnormal element is found and there is no evidence of renal insufficiency. The prognosis is benign; a cure being invariably effected after suitable treatment of the underlying digestive affection. No definite therapeutic rules can be laid down, treatment varying with the individual case. A dry diet should, however, never be prescribed. While albuminuria may appear in any dyspeptic patient, it is most frequent in young patients affected with gastric dilatation and hyperchlorhydria.

Adams-Stokes Disease.—In the peculiar condition known as Adams-Stokes disease the symptoms usually encountered are bradycardia, syncope, apnea, Cheyne-Stokes or irregular breathing, vertigo, headache, angina pectoris and cardiac asthma, apoplectic attacks without anatomical lesion, epileptic convulsions and rigidity of the pupils. The patients are generally of advanced age, but there are cases on record of thirty, twenty-three and four years, respectively. That the condition is not a disease but merely a symptom-complex is evident from the various lesions found post mortem: Fatty degeneration of the heart-muscle, mitral stenosis, with aortic insufficiency, coronary embolism, stenosis of the coronary vessels, tumor of the septum and marked fragmentation of the myocardium, in one series of cases, and in another, thickening of the vagus with swelling of the upper cervical ganglion and narrowing of the occipital foramen, compression of pons and medulla, luetic tumors at the floor of the fourth ventricle, and absence of the right cerebellar hemisphere with a varix at the pyramidal decussation. D. M. DE ROCHEMONT (Münch. med. Woch., Sept. 15, 1903) adds two cases to those already published which were peculiar in that the patients recovered. In the first the pulse varied between 27 and 18 beats, but since twice as many pulsations were observed in the jugular vein and the cardiogram showed a slight, almost imperceptible, elevation between every two beats, it is probable that every second cardiac contraction was unable to force the blood into the systemic circulation. In the second case the cardiogram showed strong contractions alternating with weaker ones; some of the latter were also recorded by the sphygmograph, though imperceptible to the fingers. It was impossible here, like in most cases, to diagnose the exact anatomical lesions from the symptoms.

Chronic Rigidity of the Spine.—Rheumatic influences and trauma are generally held accountable for Bechterew's type of chronic spinal anchylosis and intoxications and infections, such as alcoholism, gonorrhea and syphilis for the Marie-Strümpell form. The pathological process is not uniform owing to the various structures which enter into the formation of the spine; thus a rigidity may follow inflammation of the vertebræ, ossification of the intervertebral disks or the ligaments, or myositis ossificans, muscular rheumatism or spastic contractions of the muscles of the back. Sometimes all structures are involved and then it is difficult to say where the process began. Then the case is interesting only pathologically, but where the muscles alone are affected, much good can be done by treatment. E. BARG (Zeitsch. f. klin. Med., Vol. 50, Nos. 3 and 4) therefore advises that special attention should be paid to the muscles in all cases. The early diagnosis should be assisted by means of the X-rays and examination in narcosis, for delay will only permit the process to extend to the joints. Often there is a history of trauma and soon after the patients complain of stiffness in neck and back and pains in the head and back, of increasing severity. The stiffness persists, prevents the patients from working and robs them of sleep. Flexion and extension of the spine are absolutely impossible and on percussing the muscles, they are at once thrown into a spastic contraction. The walk is slow and very cautious, since the patients avoid straining the spine in every possible way. When told to lie flat upon the abdomen they generally support the body and extended legs upon the stiffly extended arms and gradually lower themselves by cautious flexion at the elbows. Sometimes the arms cannot be extended beyond the horizontal, but the hips, knees and elbows are generally movable in all directions. Under chloroform complete relaxation of the spine takes place. The treatment consists in the administration of iodides and bromides, massage, warm baths, active and passive motion and galvanism. Kyphoses, so common in the osseous form, have never been described. It is possible that the stiffness and pain are caused by a hemorrhage into the subarachnoidal space, with subsequent pressure upon the emerging nerves, since occasionally altered blood is found in the fluids obtained on lumbar puncture.

Patellar Reflex in Nephritis.—There has been an increasing tendency on the part of clinicians to study the behavior of the patellar reflex in various internal diseases in the hope of discovering constant relations of diagnostic value. The most recent contribution is by A. LION (Zeitsch. f. klin. Med., Vol. 50, Nos. 3 and 4), who finds that in the majority of cases of nephritis the patellar reflexes are markedly exaggerated. Since even the most insignificant symptoms of nephritis are considered manifestations of uremic poisoning, it is probable that increased reflex excitability must also be ascribed to this cause. Cryoscopy helps to support this theory, for almost always there is an increase of blood-concentration, even where the general condition is good. The increased patellar reflex seems to be a more delicate test than cryoscopy and is most marked in the chronic parenchymatous and the acute forms, less so in the chronic interstitial type. The presence of edema or a thick panniculus adiposus interferes with the phenomenon; with the former the nerve-fibers themselves probably become edematous, and then conduct nerve-impulses less readily. The knee-jerks also have some prognostic importance; where they increase, the intoxication is gradually becoming more severe.

Westphal's Sign in Croupous Pneumonia of Children.—Recently an absence of knee-jerks has been heralded as a new sign in pneumonia of children, especially where there is central infiltration, late appearance of physical signs or an indefinite symptom-complex suggestive of pneumonia. H. ROEDER (Deutsch. Arch. f.

klin. Med., Vol. 77, Nos. 3 and 4) cannot, however, agree to this. He found the knee-jerks absent equally as often in erysipelas, measles, scarlet fever and a number of other infectious diseases and often saw them exaggerated where there was much meningeal irritation in pneumonia.

Leukanemia.—The name leukanemia has recently been applied by Leube to a peculiar set of cases where leucemia and pernicious anemia were present in the same patient. Since then several cases have been described but no one has yet attempted a clear explanation of this peculiar condition. The patient of LUCE (Deutsch. Arch. f. klin. Med., Vol. 77, Nos. 3 and 4) developed a simple anemia with absolute increase of unicellular elements after what appeared to be a simple attack of tonsillitis. After six weeks the case could be pronounced one of lymphatic leucemia and 3½ months later the anemia had become pernicious in character. Retinal hemorrhage, heart murmurs and enlarged cervical glands appeared later, and shortly before death the spleen could be palpated. On autopsy the lesions of pernicious anemia with leucemic infiltrations in the various organs, were found, but strangely, siderosis was absent. Luce believes that these cases should be classified among leucemia; the fact that Charcot-Leyden crystals do not occur in the bone-marrow, eosinophile cells are diminished and siderosis does not occur, is not sufficient reason to set them apart as a separate symptom-complex. In all cases of leucemia, an anemia is present; if it takes on a pernicious form, this is merely a quantitative difference. Though the leucemia was lymphatic in the author's case, autopsy proved that it was due to a lymphadenoid metaplasia of the bone-marrow rather than a hyperplasia of normal lymphadenoid tissue; it is thus probable that this metaplasia is able to stimulate the erythroblastic tissue, as a consequence of which the cells typical of pernicious anemia appear in the blood. A leukanemic blood has been described with tumors of the bone-marrow, after hemorrhage and in poisoning with nitrobenzol and arsenic, which proves that both lymphopoietic and hematopoietic constituents may be stimulated by the same cause. The same holds true for the anemia pseudoleucemia infantile of v. Jaksch. Even in simple pernicious anemia there is often a relative lymphocytosis. The unknown agency which underlies leucemia thus attacks the bone-marrow as a whole like all other poisons which induce myeloid changes. The fact that leukanemia may in some cases first impose as leucemia, in others as pernicious anemia thus finds a ready explanation, but no matter what the early blood-changes, the end result will always be the same. It is even possible that in all cases of pernicious anemia, the first lesion is a moderate leucemia metaplasia of the marrow; this will stimulate the erythroblasts to proliferate like tumor-cells. From the few cases observed it is impossible to say if absence of siderosis in the liver, etc., is characteristic for leukanemia.

Bodily Exercise in Cardiac Disease.—In myocarditis, O. MORITZ (Deutsch. Arch. f. klin. Med., Vol. 77, Nos. 3 and 4) finds that bodily exertion brings about an increase of blood-pressure which frequently falls before the period of rest without, however, reaching normal figures. With rest the pressure slowly returns to normal like in healthy individuals. If the rise is but slight, severe cardiac disease is present. In valvular disease the pressure may remain normal if the lesion is moderate; when more advanced, it behaves as in myocarditis. Exceptionally there may be an initial fall but then the valves are much diseased. Differences between aortic and mitral lesions or between stenosis and insufficiency were not present. The general circulatory disturbance and the condition of the heart muscle play a more important part. In all patients suffering from heart trouble the blood-pressure may fall below normal during the period of rest as a result of cardiac fatigue. The degree of blood-pressure is not a criterion for the loss of compensation. K. HASEBROEK (Deutsch. Arch. f. klin. Med., Vol. 77, Nos. 3 and 4) writes upon the same subject and concludes that the brilliant results obtained with gymnastic exercise in circulatory disturbance are restricted to those cases where the peripheral circulation suffers with healthy heart. Where the heart itself is diseased, good results are only forthcoming if the peripheral vessels are favorably influenced. Gymnastics are an important prophylactic measure in the early stages of circulatory disturbance and compensated heart-failure, since the development of the vitiary circle is prevented or delayed.

SURGERY.

Control of Hemorrhage after Pelvic Operations.—In cases where after extensive pelvic operations there has occurred bleeding from raw surfaces or veins which it was impossible to clamp or suture, the use of a rectal proctoscope introduced through the abdominal wound for both examination and packing the pelvis with gauze, is recommended by J. A. SAMPSON (Johns Hopkins Hosp. Bull., Sept., 1903). In suitable cases the lower end of the abdominal incision is opened and the proctoscope introduced with very little pain. The obturator may then be removed and the pelvis may be inspected by moving the instrument from side to side, using reflected light and a head mirror. Gauze may then be introduced through the tube with the aid of a long forceps and by turning it from one side to the other, all parts of the pelvis may be reached, and the instrument is then gradually withdrawn as the pelvis becomes filled with gauze. Several drains may be introduced in this manner and the projecting ends folded over the incision and covered with pads. A tight abdominal binder is put on and the vagina is also packed in such a manner as to elevate the cervix. A firm pad is then placed over the vulva and held in place by a perineal strap. The author cites a number of cases in which the method was successfully employed and believes that a diagnosis may be made in obscure cases without causing much shock or pain, that hemorrhage may be controlled, that the gauze is introduced through a sterile tube and without pain, and that the instrument in question is easily manipulated and admits wide strips of gauze.

The Etiology of Harelip.—This much-disputed question has been the subject of an extensive study by T. HAYMANN (Archiv f. klin. Chir., Vol. 70, No. 4). From a study of the literature and a large amount of embryological material, he concludes that the deformity is not caused by the formation of amniotic bands as stated by some observers. For, as a rule, trauma caused by the latter are distinguished by their multiple character. If amniotic bands are present in a pregnant uterus, their effects are not confined to one part, but are usually also distributed over the trunk and extremities. The rare occurrence of amniotic deformities of the limbs in comparison with the rather frequently found examples of harelip makes it seem somewhat improbable that the development of amniotic bands plays any considerable rôle in the development of a typical harelip or cleft palate. It is known, moreover, that many individuals afflicted with harelip also present other evidences of incomplete development, in the brain, the spinal cord, the sensory organs, the vascular system, the urogenital tract and the abdominal wall. In 11 cases of harelip there has also been reported polydactylism, which seems entirely opposed to any amniotic influence and considered in connection with the other facts seems to point less

to trauma caused by amniotic bands than to interferences in the development due to other causes. Summing up the evidence adduced by the author we find that these defective developments are the results of hereditary influence. He shows that in certain families, there has been a tendency to these malformations, extending through three or four generations. One or two generations may be entirely free from trouble, but in the third it again reappears.

The Discovery of the Stomach Tube.—It is generally believed that two English surgeons, Jukes and Bush, are the inventors of the stomach tube. It was introduced by them in 1822, for the purpose of evacuating the stomach in cases of poisoning. J. Friedenwald (Johns Hopkins Hosp. Bull., Sept., 1903) thinks that the credit of the invention belongs to P. S. Physick, of Philadelphia, who first used the tube for the same purpose, as early as 1800, and recommended it to his students in the course of his lectures for many years. By his advise the tubes were made in Paris in 1803. In 1812, he published several cases of poisoning where it was used successfully. Friedenwald has found references to this in early American medical journals and the facts are corroborated by other writers well-known at the time.

Celluloid as a Material for Flatfoot Plates.—In some ways sheet celluloid makes an ideal material for foot plates for it can be molded on a plaster cast to any desired shape in a few minutes by the use of boiling water, besides having the advantage of being light, cheap and non-corroding. H. W. Jones (N. Y. Med. Jour., Sept. 5, 1903), after considerable experience with it in comparison with other materials, especially steel, finds that it is deficient in two very important qualities which steel possesses, namely, rigidity and durability. Celluloid plates are unable to support the longitudinally flattened arch in an adult unless a very heavy grade is used or unless made with both an inside and outside flange running the whole length. If the latter conditions are fulfilled the plate takes up too much room to be comfortably worn. In beginning flat-foot, where a springy plate is desired or in children it is possible to use this plate in the longitudinally flattened arches. In cases of flattened transverse arch, in the so-called Morton's disease, its use has proven very gratifying, especially as most of the cases are nervous women who appreciate a light plate. Furthermore, as the curve is short instead of long and sweeping, the plate does not flatten out so easily. He concludes that although celluloid is a cheap material for flat-foot, easily made and altered, its limitations and unreliability make it far inferior to steel for general use.

Value of Intestinal Peristalsis in Diagnosis of Abdominal Wounds.—The presence or absence of peristaltic movements in the intestines as elicited by auscultation is considered a very important sign in non-penetrating wounds of the abdomen by O. C. Gaub (Penn. Med. Jour., Sept., 1903). From his clinical experience in a number of cases of abdominal injury of this character, he was led to determine by animal experiment whether peristalsis ceases after a violent blow on the abdomen, whether there is an approximately definite time when it returns, provided no hemorrhage or laceration of the gastro-intestinal tract occurs, and finally, if a tear occurs in the gastro-intestinal tract allowing the escape of its contents, whether the primary arrest of peristalsis is made permanent by the beginning peritonitis. A number of dogs under anesthesia were subjected to violent blows on the abdomen. It was found that peristalsis immediately ceased when such a blow was struck, that after a time peristalsis returns if no injury to the tract has taken place, the time coinciding with the general subsidence of the symptoms of shock. The author concludes from these experiments and the clinical cases he has seen that any injury to the abdomen sufficient to abolish peristalsis is a grave one, and if at the end of four hours, all means having been instituted to combat shock and no peristalsis returns, and if the pulse increases in frequency, sufficient evidence is at hand to justify operation.

Operations in Diabetic Patients.—There is a well-marked antithesis to operating on patients afflicted with diabetes, and it is widely believed that sloughing in an operative wound is to be expected. C. P. Noble (Am. Med., Sept. 26, 1903) believes that this view had its origin in the fact that most operations undertaken in diabetics were for gangrene and therefore does not form a fair criterion. The author has operated on seven women suffering from diabetes mellitus, six of which made good recoveries and the other died from coma on the sixth day after operation. All were major operations and to this number the author has added 62 cases collected from the literature. The total showed a mortality of 24 per cent., about half of which died from diabetic coma after the operation, but the operative results were good. The rule to which the author adheres is that operation is postponed if there is more than two per cent. of sugar in a total excretion of three pints daily. In all cases preliminary treatment by strychnine and codeine was followed. This was also given after operation in addition to free use of salt solution per rectum and under the skin. The counter-indication to operation is strongest in those patients suffering markedly from the constitutional symptoms of diabetes—poor nutrition, wasting, intense thirst and morbid appetite.

Decapsulation of the Kidney.—The operation announced by Edebohls in 1901 is discussed in its various aspects by J. Tyson and C. H. Frazer (Univ. Penn. Med. Bull., Sept., 1903), who also report a case in which it was tried with favorable results. The patient, a girl of nine years, presented evidences of a type of post-scarlatinal nephritis, which persisted for five years with acute exacerbations. Her condition finally grew desperate and as no relief could be secured from any further medical treatment, decapsulation was done first of one kidney and then the other according to the method indicated by Edebohls. After the first operation the excretion of urine was immediately increased from 21 to 63 ounces on the fifth day. On the tenth day the ascites and anasarca had entirely disappeared and the albumin diminished from one-half to one-tenth in volume. Two months later the second operation was done with similar effects. After the patient was allowed to get up, the albumin again increased in amount, but the urine was secreted freely and the casts were mainly hyaline. Her general condition continued good to the time of the report. The urinary conditions prevent the claim being made for a cure, but undoubtedly the patient's life was saved by the operative treatment. In discussing the ultimate results, the authors, from the knowledge of the histological changes that take place in the tissues that have been subjected to such manipulations as are prescribed and from the results of the experimental work done by Johnson on dogs, where it was shown that decapsulation does not produce any increased vascularity in the perirenal tissue, conclude that in the course of time, through the organization of the granulation tissue into connective tissue, the kidney will be again surrounded by a fibrous capsule and one probably several times thicker than the original one. The operation therefore seems irrational, although it must be admitted that the clinical results are favorable and cannot be disregarded. They would perform the opera-

tion in a patient in whom all other attempts at alleviating the condition had failed, and death was imminent, provided it was reasonable to assume that the patient would survive the immediate effects of the operation.

Tuberculous Rheumatism.—Whether or no rheumatism really occurs as a complication of tuberculous affections of the skin, whether it is of real clinical importance, has special characteristics and develops under definite conditions of age and sex, are the problems the solution of which BOUVEYRON (Rev. de Chir., Sept., 1903) has sought in a study of 44 cases of lupus vulgaris and two of lupus erythematosus. Of this number, 14 presented definite symptoms of tuberculous rheumatism. He finds that the latter is a very rare complication of lupus vulgaris in children under fifteen years; in adults, however, in whom the disease attains a greater severity, rheumatism is a frequent complication. The arthritic form, with or without exudation or tumefaction, is most frequent. These arthralgias are mono- or polyarticular, indolent, but moderately painful and rebellious to all the classical methods of treatment. They may disappear temporarily to return in the same or a different joint; or they may improve without any apparent reason or in the course of a febrile disease. The condition of the lupus does not seem to directly influence the affection; neither is there anything special in the general condition of the patient. The ostalgical or hyperostosic form ranks next in frequency; in the author's cases being met with only in women and in the proportion of four in seven. The hydarthritic form of rheumatism was seen in lupus patients in the proportion of three in twelve. The pathogenesis of such rheumatic affections is not understood.

Tumors of the Retrocarotid Gland.—A contribution to the literature of this subject is made by P. RECLUS and M. CHEVASSU (Rev. de Chir., Sept., 1903), who give a detailed description of a case which came under their care. The etiology of these tumors is not understood, but they occur in early life; in the few cases reported, the affection having been seen between the seventeenth and thirty-third year. They seem to be made up in most cases, as in that described by the authors, of blood-vessels and numerous cells of undetermined origin, the whole enclosed in a capsule. Of slow growth, the patient becomes aware of the existence of the tumor by chance or after it has gained sufficient size to cause some discomfort; slight pain in its neighborhood, in some cases, first calling attention to it. With the head slightly extended, the outline of the tumor may be readily recognized and at the same time it may be seen to pulsate; these pulsations being synchronous with the radial pulse. The tumor occupies the carotid region, embracing the division of the common carotid and the bifurcation of its two initial branches. Its size is said to vary between that of a pigeon's and hen's egg, it is generally soft and elastic, quite mobile transversely, but slightly so vertically and it may be made to disappear under pressure; though upon withdrawal of pressure, it regains its former size within two or three successive pulsations. Auscultation over the tumor may reveal a systolic murmur. The pulsation seen is the most striking symptom, this being synchronous with the radial pulse, non-expansile and disappearing upon compression of the common carotid. The authors state that a positive diagnosis of tumor of the retrocarotid gland may be made in the presence of a single, soft, pulsating, non-expansile tumor of slow development, in the carotid region at the level of and above the thyroid cartilage. Treatment is surgical, consisting in extirpation of the tumor.

Retraction of the Palmar Aponeurosis.—There is much to indicate that this condition is related to a trophic disturbance depending upon some lesion of the nervous system; but the case reported by C. FÉRÉ and R. DEMANCHE (Rev. de Chir., Sept., 1903) seems to point to its origin in a lesion of a peripheral nerve rather than of the periependymal gray matter. The patient, who came under treatment for mental disturbance and tendency to melancholia, gave a history of a fracture of the lower part of the right forearm, treated by immobilization during two months. A month after removal of the apparatus, he noted that the finger had a tendency to become flexed upon the palm and was extended with difficulty. The condition progressed from this time till he came under the authors' observation, four years after the injury, when the hand presented the characteristic deformity of retraction of the palmar aponeurosis; the most striking feature of which was the permanent flexion of the fifth finger, accompanied by muscular atrophy in the region supplied by the ulnar nerve. The fourth finger was also slightly flexed at the metacarpophalangeal articulation and the joints of the second and third phalanges of the last four fingers were somewhat enlarged. The whole palm was markedly concave and the hypothenar eminence flattened from atrophy of the muscles. Upon palpation, a fibrous band could be felt extending from the base of the fifth finger to the annular ligament whence it threw out a prolongation to the base of the fourth finger. In addition to the gross appearance of the deformity characteristic of fracture of the lower extremity of the forearm, the X-rays revealed a separation of the styloid process from the ulnar bone and to this the authors especially attribute the lesion of the ulnar nerve and consequent deformity of the hand. Upon the discovery of this unreduced fracture they base their diagnosis of the peripheral origin of the palmar retraction; though the patient's inherited neuropathic tendency, together with some evidence of a rheumatic diathesis, seen in ulnar deflection of the fingers of the left hand, constituted nice points in the differentiation of the affection.

Operation for Femoral Hernia.—The disadvantages of most operations for femoral hernia, says P. HERZEN (Centralbl. f. Chirurg., Sept. 12, 1903), lie in the fact that the periosteum over the convexity of the pubes cannot be grasped sufficiently with a curved needle to allow Poupart's ligament to be fixed firmly to it. The pectineal fascia must also be used, which leads to a wide gaping of the external abdominal ring and does not close the femoral canal. The following method is therefore recommended: Incision through skin and connective tissue and dissection of the hernial sac as usual. A ligature is placed around the neck and the sac then amputated. The femoral vein is then freed somewhat and pulled inward and Poupart's ligament displaced upward so that the entire femoral canal is exposed freely. A flap of periosteum 1 to 1½ cm. long and as broad as the femoral canal, with its base at the pectineus, is then turned downward from the upper surface of the horizontal ramus of the pubis. Two to four fine canals are now bored through the bone, so that the drill comes out upon the surface bared of periosteum. Several wires of aluminum-bronze are passed through Poupart's ligament and through these canals and tied so as to bring the ligament close to the bone. Finally, the periosteal flap is sutured over the ligament and the skin-wound closed.

HISTOLOGY, PATHOLOGY AND BACTERIOLOGY.

Solitary Tubercle of the Stomach.—A form of tuberculosis hitherto undescribed was found at autopsy by R. McL. VAN WORT and is reported in the Johns Hopkins Hosp. Bull., Sept., 1903. No previous history was obtained from the patient, a negress eighty-eight years of age, who died from exhaustion a few days after

entering the hospital. The post mortem showed the general sclerotic senile changes in vessels and organs, and, in addition, ulcers and caseous tubercle of the stomach. Examination of the latter showed it to be similar to that found in the central nervous system. It was completely surrounded by unstriped muscle and was the primary seat of the disease in the stomach. The original entrance of the infection could not be traced. The tubercle bacilli were found in the tissues and recovered from an experimental animal with the production of the typical lesions of tuberculosis. Clinically the case is of little interest, as the condition probably gave rise to no symptoms during life. The tubercle could readily be felt through the stomach wall after autopsy, but as it was situated under the costal margin, it could not have been felt during life.

Origin and Characters of the Alexins.—This subject has been investigated for some years by R. TURRO (Berl. klin. Woch., Sept. 7, 1903). He has been able to demonstrate that the alexins are a product of the cell plasma. They become functional when dissolved in physiological salt solution. The characters of the individual alexins vary with the cell plasma from which they are derived; some are efficient against one species of bacteria, some against another. Alexins were experimentally demonstrated in the thyroid, in the suprarenal capsules, the kidneys, the lymph glands, the muscles, in the liver and spleen, in the blood plasma. From the chemical standpoint, alexins may be considered as enzymes, which digest the bacteria by means of a progressive hydrolysis. The degree of the resistance which an organism exposed to infection manifests (that is, the natural immunity), depends on the physiological processes in the cell plasma which favor the solution of the alexins and in this way bring them into action.

Cause of Gaseous Infection.—Besides the specific gas-producing bacilli, gaseous phlegmons can also be set up by the ordinary colon bacillus. From a case of delirium tremens with gas infection of the arm, D. DANSAUER (Münch. med. Woch., Sept. 8, 1903) could isolate the colon bacillus together with three other pyogenic germs. Experimental inoculations of culture of these germs, gave rise to gaseous phlegmons most often when both streptococci and colon bacilli were injected. It seems that the action of the colon bacillus is a purely saprophytic one and that it merely decomposes tissues of low vitality, such as occur with diabetes, alcoholism, etc., or tissues rendered necrotic by the action of other bacteria. Introduced alone into the healthy human body it is not capable of producing gas.

Pathogenesis of Neuroparalytic Pneumonia.—The pathogenesis of pulmonary inflammation following section of the pneumogastric nerves is a subject of conjecture among pathologists and physiologists alike. T. CIVILETTI (Gazz. Siciliana di Med. e Chir., No. 20, 1903) has contributed his quota toward the solution of the question by a series of experiments upon rabbits, which seem to show that vagotomy induces such a decreased resistance in the pulmonary tissue as to render it fit soil for the multiplication and development of pneumococci and the attendant inflammatory reaction in the lung. The author's work embraced immunization of the animals against the pneumococcus with Pare's and Rerzi's serum, bilateral vagotomy and subsequent inoculation with virulent cultures of pneumococci. In nine rabbits immunized and vagotomized the classical pneumonia developed, whether subcutaneous inoculation with pneumococci had been practised or not. The same result was seen in non-immunized animals subjected to vagotomy and subsequent inoculation. On the other hand, inoculation of non-immunized and non-vagotomized animals with the same cultures resulted solely in diplococcic septicemia without pneumonia.

OBSTETRICS AND GYNECOLOGY.

Removal of Uterus in Double Pyosalpinx.—Clinically there has been observed a purulent endometritis in a very large percentage of the cases of pus tubes which MANN (Am. Gyn., July, 1903) has operated upon. If this be admitted, why leave the uterus to be a source of suffering and possible infection afterward? One has seen many cases where after removing the pus tubes the patient has not been symptomatically cured, discharge and pain are frequently observed, and sometimes metrorrhagia, and the removal of the uterus has later become necessary. In a small proportion of cases, menstruation continues for a time, for years perhaps, after removal of both tubes and ovaries, but it is rarely normal, being more often the source of various troubles. The removal of the uterus in such cases does away with the trouble and the necessity for further treatment. The occurrence of cancerous disease of the uterus after removal of the tubes and ovaries is very rare, as statistics will show. Still the possibility of such an occurrence in an organ rendered functionally incompetent ought to be enough to favor its removal. Perhaps the strongest argument for its removal is to be found in cases where the infection is still acute. If the uterus be extensively diseased—that is, involved in inflammation, and be left in a ragged and disorganized condition, after the adhesions are broken up and the appendages are removed, or if it be greatly enlarged, then its removal seems to be a matter of course, as it is likely under those circumstances to make more trouble than would possibly be caused by its removal. The French operators remove the uterus as a matter of routine. One of the arguments set forth against the removal of the uterus is that the sexual life of the woman is destroyed thereby. This is not so, as the sexual life is in no way dependent upon the presence of the uterus, but upon the presence of the ovaries, which are the dominating factors in sexual matters. It is always best to preserve them, where possible, in a woman under forty years of age. There is in the author's mind no extra risk to the patient in the removal of the uterus, but, on the contrary, one gets much better drainage, which adds to the security of the operation. Atrophy of the vagina, which is sometimes seen to follow the removal of the uterus and appendages, is not due to removal of the uterus, but to the establishment of menopause by the removal of the ovaries. The author has never seen anything approaching hernia or prolapse of the pelvic contents, due to the removal of the uterus, except in some cases of procidentia.

Iodine Treatment of Puerperal Sepsis.—An investigation of the uterine discharges and the contents of the pelvic cavity in cases of puerperal sepsis has resulted in a more definite idea of the conditions which must be treated. W. R. PRYOR (N. Y. Med. Jour., Aug. 22, 1903) has operated upon 37 cases, in all but one of which streptococci, generally mixed with other germs, have been found in the uterine discharge and in all the cases streptococci were found in the pelvic cavity. He not only does a curettage in these cases and packs the cavity with iodoform gauze, but he also does a posterior section of the vagina and packs the cul-de-sac full of iodoform gauze. The results have been uniformly good and on the third day the germs have been absent from the discharges in every case. This excellent result is attributed to the local iodism which is caused by the action of the exudates upon the iodoform, thus setting free iodine. The absorption of this iodine through the infected lymphatics is supposed to have a decided and beneficial effect. The after-treatment of these cases is so technical and consumes so much time that it would be difficult to secure for

it a very general adoption. Attempts are now being made to secure this local and general iodism by more easily effected means.

Indications for Inducing Labor in Hyperemesis and Heart Disease.—In considering the advisability of inducing labor for hyperemesis during pregnancy, O. TUSZKAI (Berl. klin. Woch., Vol. 40, No. 35) urges conservatism, until the true cause of the complaint can be ascertained. It has already been pointed out that in many cases, hysteria is the direct cause of this condition and in others an intercurrent disease, such as meningitis, gastric trouble, nervousness, or peritonitis, may be at fault. The author believes that the only cause for a true hyperemesis gravidarum, which does not disappear until pregnancy is interrupted, is to be found in a perimetritic irritation. The latter is due to an anemia of the perimetrium brought about by the inability of the peritoneum to stretch in proportion to the increase in size of the pregnant uterus. It is essential to exclude, therefore, all other factors, especially hysteria, by the application of all possible diagnostic and therapeutic measures. The diagnosis of a pregnancy itself being at fault must be based on the following signs: Increased tendency to vomiting on local irritation, such as a bimanual examination, especially in those cases where it is known that a previous perimetritis has interfered with the elasticity of the peritoneum. Even then radical measures should not be undertaken until local treatment which endeavors to improve the circulation of the parts in question (heat or cold on the abdomen or per vaginam) has proved ineffectual, and the prostration has reached a comparatively high point. The latter must be judged by the rapid decrease in body-weight, in amount of urine voided daily, and in the number of the red blood cells; also by the increased specific gravity of the urine, the increase in the alkalinity of the blood, and the greater frequency in the pulse rate. If in these advanced cases large doses of opium do not help, by inhibiting the functions of the excretory organs, immediate delivery should be undertaken. Regarding cardiac disease, the author believes that particular attention should be paid to the behavior of the pulse where it is known that heart lesions have at any time been present. He was able to prove that irregularities in the pulse rate which had disappeared when compensatory hypertrophy was established, became evident again during the course of a pregnancy as the sign of a consecutive dilatation. When this sign appears early in the course of a pregnancy, where previous heart lesions had been present and does not readily respond to treatment, it is advisable to interrupt the pregnancy rather earlier than has hitherto been the case. Where the pulse symptom does not appear until late in the course of the pregnancy, labor need rarely be induced, but the incompetency must be carefully watched.

Pregnancy During Lactation.—Attention is called to the danger of allowing these two conditions to overlap by H. M. CHURCH (Edinb. Med. Jour., Sept., 1903). In the first place he believes that it is much more infrequent than ordinarily supposed, about 30 in 1,000 cases, which came under his own observation. He states that from his own experience the suckling was or became a delicate child, and usually at some time suffered from some affection of the nervous system or was the mentally weak one of the family. During lactation the embryo was apt to be prematurely expelled from the uterus, or if did reach full term, in many cases it did so with lowered vitality. In addition, the health of the mother was generally undermined for a longer or shorter time. Whenever a diagnosis of pregnancy is made during lactation, the nursing child should be weaned at once. Ten cases are detailed which support the author's contention. The breast milk is shown to be changed during menstruation and a greater change occurs from a new pregnancy.

Ichthyol in Puerperal Fever.—On account of the frequency with which an infection of the uterus after delivery extends beyond the point where simple curettage can be effectual, the knowledge of an agent which may also penetrate the walls of the womb and counteract the poisoning effects of the bacteria would be most welcome. J. O. MACPHERSON (Med. Rec., Sept. 12, 1903) has made use of ichthyol in five severe cases of puerperal fever and claims excellent results for this method treatment. In these cases the uterus was first thoroughly irrigated with a bichloride (1 in 4,000) solution and the uterus packed with gauze soaked in equal parts of ichthyol and glycerin. In two of the cases instead of ichthyol gauze two drams of a 50-per-cent. ichthyol watery solution were injected into the uterus. The improvement was very noticeable in each case. The irrigations and ichthyol applications were repeated in some of the cases, but the improvement which followed was attributed to the beneficial influences of ichthyol.

Chorionepithelioma.—The chief problem of deciduoma malignum, as of other malignant tumors, is, according to J. H. TEACHER (Brit. Jour. of Obstet., Aug., 1903), how to make our observations of its nature and origin applicable in the treatment of the patient. The so-called deciduoma malignum is a tumor arising in connection with pregnancy, and originating in the chorionic epithelium (or its forerunner, the trophoblast), which is of fetal epiblastic origin. These tumors form quite a characteristic group clinically, pathologically and developmentally, and they should be classified neither as sarcomata nor as carcinomata, but as a distinct class sui generis. The most appropriate name is chorionepithelioma malignum. Malignant hydatiform mole may be treated as a variety of this disease. In addition to the common tumors developing from a pregnancy, there are tumors containing precisely similar structures which are not connected with pregnancy, and may occur in other parts of the body and in either sex. The most probable explanation of them is that they are teratomata, originating from some structure which has the morphological value of an included and fertilized ovum, and the chorionepitheliomatous tissue represents the actual trophoblast (chorionic epithelium) of the included ovum. Special care must be exercised in diagnosing between hydatiform mole and chorionepithelioma arising in connection with that condition. While the prognosis in all cases of chorionepithelioma is a grave one, early recognition and an early radical operation offer a fair chance of recovery. The fact that metastasis has occurred does not necessarily preclude successful operation, although it materially diminishes the chances of success.

Necrobiosis.—In a study of this variety of necrotic change taking place in fibromyomata of the uterus, JOHN S. FAIRBAIRN (Brit. Jour. of Obstet., Aug., 1903) finds the following points borne out: (1) The tumors most frequently affected by this fleshy necrobiotic change are the interstitial fibroids of moderate size. (2) In spite of their blood-stained appearance, they are not engorged with blood, and hemorrhage and vascular congestion are not the marked features in these tumors, as is seen as the result of interference with the venous return. The characteristic change is one of necrosis, as is seen by the disappearance of the nuclei, or by their inability to take up nuclear stains, and, later, by a softening or a disintegration of the muscular fibers. Their color is probably due to a diffusion of blood pigment through the dead tissue by a process similar to that which occurs in the laking of blood. (3) The change begins in the center of the tumor, and when it is partial the central portions only are involved. In the ma-

jority of incidents, however, the whole growth is found to be affected. (4) The process occurs most frequently during the child-bearing period of life, and pregnancy has a distinct predisposing influence in its production. (5) Pain is a very frequent symptom, and is the most common cause of surgical interference; tenderness of the tumor is less frequently observed; fever is unusual. The symptoms produced by these necrotic changes are scarcely sufficiently defined to lead to a recognition of the change having taken place. The occurrence of severe pain in a patient with fibroids, especially during pregnancy, or shortly after its termination, strongly suggests a necrotic process in the tumor, and gives a distinct indication for operative interference.

The Value of Conservative Gynecological Operations.—Compared with radical procedures, says W. P. MANTON (Am. Gyn., August, 1903), in which the mortality, according to Hector Treub's latest statistics, of from 5 to 6 per cent. in the hands of the best operators, the mortality from conservative operations on the uterus and its appendages but 2 per cent., at the very highest, is certainly in favor of the latter. The percentage of somatic cure in either case is more difficult to estimate, but from the literature of the two methods, one is certainly convinced that conservatism offers the better prospects for the patient's future. But symptomatic cure is not all that must be considered in this connection, and the true value of conservative surgery of the pelvic organs cannot be estimated alone from this point of view. In forming conclusions we must take note of the rapid convalescence following reconstructive surgery, the more satisfactory improvement in the general health of the patient, the maintenance of the normal functions of the reproductive organs, and the possibility of future pregnancy which non-destructive surgery alone can offer. Extirpation of the ovaries, besides imposing sterility, deprives the system of the internal secretion of these organs, a principle absolutely necessary under ordinary conditions to the continuance of somatic well-being and the absence of which, as Brown-Séquard long ago pointed out, is felt by the whole economy. Ablation of the uterus deprives the individual of the hope of maternity, and in this way, as well as reflexly, may lead to both mental and bodily disturbance. To the candid mind there can be no question as to the value of conservatism as against radicalism.

Parturient Uterus Fixed in Retrolateroversion.—In a clinical and anatomical study of a case of this variety, MM. PINCARD, SEGON and COUNVELAIRE (Am. de Gyn. et Obstet., July, 1903) have arrived at the following conclusions: (1) Certain extensive parametritic adhesions fixing the uterus in vicious irreducible position are not incompatible with the evolution of pregnancy to term. (2) In the case studied the anterior wall of the uterus was markedly thickened, whereas the posterior wall was diminished in its muscular development. (3) The irreducible fixation of the body of the uterus in retrolateroversion had produced an atypical development of the lower uterine segment consisting in an enormous partial distention of the region nearest the abnormally developed deviated axis of the body of the uterus. (4) The vicious position of the fetus was consistent with the complex distortion of the uterus and the unequal development of the different portions of the generative organ irreducibly fixed in the vicious situation. (5) Dystocia necessitated, for the safety of the mother and child, a Cæsarian section followed by a hysterectomy. (6) The success of the intervention was complete, both for the mother and child.

Biochemistry of Pregnancy.—Some interesting experiments have lately been conducted by E. OPITZ (Deut. med. Woch., No. 34, 1903). By the injection of human placental tissue freed from blood, into animals (rabbits, goats, heifers and horses) he secured a serum, which he calls "syncytiolytic," and which he applied in several cases of eclampsia. It was found to display an antitoxic power against the assumed syncytiotoxins, which the author believes are circulating in the blood in eclampsia and form one of its etiological factors. This process he explains as follows: As soon as the maternal blood penetrates the trophoblasts, cells from the periphery of the ovum find their way into the maternal blood and are carried away into various organs. These deported cells are destroyed sooner or later, under the action of cytolysins formed in the blood of the mother, and their disintegrated particles have a toxic action as foreign bodies. To neutralize these, another substance is produced in the blood, the "antisyncytiotoxin." Opitz has succeeded in reproducing this process in animals by injection of placental tissue and their serum acquires the properties of an antisyncytiotoxin. The results of the application of this serum in eclampsia have encouraged the author to advise the preparation of this serum in marketable quantities. It was proven absolutely harmless and the details of its action, etc., will be given in a later communication.

PEDIATRICS.

Metabolic Experiments on the New-born.—A comparison of the results obtained in a careful series of experiments, revealed to O. ARONSTAMM (Archiv f. Kinderheilk., Vol. 37, Nos. 1 and 2) that small infants, for each unit of bodily surface, use up a greater amount of energy than larger infants, which result modifies the law of Rubner that the needs of nutrition are proportional to the absolute extent of surface.

Whole Milk in Infant-feeding.—Since 1901, Dr. Oppenheimer, in the Munich Ambulatorium, has used whole milk in the feeding of infants. In spite of the unfavorable results obtained by other observers, those obtained in Munich have been good. In generalizing from an analysis of 129 of the recent Munich cases, ELEANOR FITSCHEN (Archiv f. Kinderheilk., Vol. 37, Nos. 1 and 2), gives the following rules for the use of undiluted cow's milk in the feeding of both healthy and diseased children. In the case of children that have been habituated to another method of feeding, the use of whole cow's milk should be gradually introduced. In the presence of acute gastric disease, whole milk should be excluded and should be reintroduced only after the use of diluted milk. An exception to this rule is when ass's milk is administered undiluted after the use of the so-called tea-diet. In the instances of infants suffering from acute diseases like pneumonia, it is not advisable to change the nourishment if the previous method of feeding has been well borne. Children in the first ten days of life should receive diluted milk, not because this period is considered a certain contra-indication to whole milk feeding, but because it has not yet been established that whole milk during the first few days is successful. Overfeeding should be carefully avoided. Breaking this rule results in sad, frequently fatal consequences. The following is given as an example of a successful case of feeding by this method: An infant that during the first four weeks of life, had received besides the breast-milk various forms of diluted milk, was brought to the clinic suffering from constipation. The whole milk treatment was begun gradually, the child at first receiving 300 grams milk and 400 grams water in 7 feedings, at intervals of three hours. The strength of the milk was gradually increased until at the end of fifteen days, the child received 700 grams of whole milk in 7 feedings. In the weaning of breast-fed children, the following rule should be observed: By weighing the child before and

after nursing, one should determine how much milk the child has taken from the breast in one day. The following day the child is given half as much cow's milk diluted with an equal quantity of water. The dilution is gradually diminished from day to day until whole milk is attained. As regards the age at which whole milk feeding is begun, there is no substantial difference between the results in children from four weeks to three months, and in children from three to six months. The results are rather better in the younger children. In infants under four weeks the results are less satisfactory.

Pneumatocele Cranii Occipitalis.—The careful study of a case presenting this condition, that of a child, three years old, enables J. DE BARY (Archiv f. Kinderheilk., Vol. 37, Nos. 1 and 2) to characterize this disease as follows: The swellings have been incorrectly considered chronic. The possibility of an acute course is proved by the fact that in the case reported, the process from the beginning until the spontaneous cure, lasted ten days, and five months later no change in the skull was noticed. An examination of the skull later, when healing was complete, revealed the fact that the thickenings at the base and borders of the swelling, which are usually attributed to changes in the bones, are rather due to the lifting up of the periosteum, analogous to the cases of cranial wounds and hematomata.

Effect of Addition of Alkalis to Cow's Milk.—It is generally supposed that cow's milk is acid and breast milk alkaline, so that the chief object in adding lime water or soda to the former in modifying it for infant feeding is to render it alkaline and hence less disturbing to the stomach. C. KERLEY, A. H. GIESCHEN and G. T. MYERS (Med. Rec., Aug. 8, 1903) have made a careful investigation of the reaction of breast milk and find that it is normally acid and that the addition of the usual amounts of lime water to cow's milk do not actually turn the milk alkaline, although the litmus paper may become blue. The use of this paper is, furthermore, very unsatisfactory, for it varies greatly in regard to its reaction to acids and alkalis. Milk is known to be frequently amphoteric and by selecting particular samples of litmus paper widely different results can be found. The beneficial effect which the use of alkalis seems to have was next studied and it was found that both lime water and sodium bicarbonate had the distinct and constant effect of inhibiting the formation of curds when pepsin was added and also prevented the formation of too dense curds which interfere seriously with the complete digestion. The teaching that lime water or bicarbonate of soda should be added to fresh milk or feedings simply because they are antacids is erroneous.

The Treatment of Clubfoot Under Three Years.—Nothing more is needed to correct this deformity than a succession of plaster bandages properly applied. A. R. SANDS (Am. Jour. of Obst., Aug., 1903) describes the following method, which he first advocated in a paper read before the Orthopedic Section of the New York Academy of Medicine in 1893: First apply a piece of felt to both the inner and outer borders of the foot, extending it over the malleoli. This is done as an extra precaution for the protection of the bony prominences, being needed especially over the metacarpophalangeal joint of the great toe, and over the cuboid bone—this being usually very prominent. Then apply at least two thicknesses of canton flannel to the foot and leg, extending it to the tuberosity of the tibia. Now, having the foot and leg well protected, the plaster is applied also up to the tuberosity of the tibia. This will prevent the leg from moving in the plaster cast, and give a better leverage when the twisting process is begun. Care should be had to have the toes held in their natural relation to each other. The plaster should extend well over the toes, but their ends should be exposed. While waiting for the plaster to set, grasp the leg with one hand, holding it firmly on the table, and with the other hand press on the plantor surface with a board; this serves the purpose of overcoming some of the deformity, and gives a flat surface on which the child can walk better. When ready to begin the redressment, cut out a wedge-shaped piece of plaster on the outer border of the foot over the most prominent part of the deformity, for here the greatest pressure is needed; then connect the upper and lower angles of this cut by cutting a line through the plaster entirely around the foot. Care should be taken not to allow this cut around the foot to be near enough to the heel to allow the front part of the foot to move in the dressing when the foot is twisted, for then the object in view would be defeated. The plaster cast is now in two pieces, each fixed to the foot. By grasping the leg with one hand and the foot with the other, it takes but little force with this leverage to bring the opposite ends of the wedge-shaped cut into apposition, which corrects a certain amount of the deformity. While an assistant holds the parts in a position of their new relation to one another, they are fixed there by a wet plaster bandage applied around the foot and ankle in a figure of eight, care being taken to fill in the gap made by the linear incision on the inner side of the foot. This third plaster bandage, being applied over the dry cast, can be easily peeled off at the next sitting; then make the wedge larger and repeat the dressing as before. This can be repeated three or four times, when it will become necessary to apply a new bandage. The number of sittings will have to be regulated by circumstances, pain, etc. The twisting should be done about three times a week, until the foot is in a normal position, then once a week until the desired overcorrection is obtained; then the permanent dressing is applied. The condition of varus should first be corrected, and then the equinus should be overcome by making the wedge incision over the dorsum of the foot, and proceeding as before. As a rule, it might be said that the foot should be kept in a prominent dressing for at least six months after the child begins to walk. After the dressing is left off a close watch should be kept on the patient, and just as soon as it is discovered that there is a tendency to relapse, the foot should at once be put up in plaster again, or, in whatever retentive apparatus may be selected. The author prefers either plaster or silicate of soda to the brace.

Hydrotherapy in Acute Infantile Gastro-Enteritis.—In the treatment of acute gastro-enteritis P. ADOLPHO (Gazz. Osped., Aug. 30, 1903) has found his greatest success in placing the entire alimentary tract in a condition of complete rest by withdrawing all food during a period of from twelve to thirty-six hours, and administering, during that time, nothing but boiled water—cooled and kept in a closed vessel—in large quantities, divided in frequent small doses. The effect of water thus given, he claims, is manifold; a detergent influence being exerted thereby upon the intestine, which is the site of digestive engorgement; the irritability of the mucosa being allayed and the great thirst which is present appeased. Moreover, water treated as described is a poor medium for the development of bacteria. The author states that all diarrheas of dietetic origin invariably yield to this line of treatment and that vomiting also promptly yields to its influence.

PHYSIOLOGY.

The Influence of Rennin upon the Digestion of Milk.—The discovery by Sternberg of the fact that the gastric juice of the infant contains much less rennin than that of the adult, led this investigator to maintain that, since the natural food of the infant is almost exclusively milk, the low rennin content in the gastric juice of infants would seem to indicate, that rennin does not materially promote the digestion of the milk proteids. As the result of a series of experiments performed in an attempt to verify the above conclusions, P. B. HAWK (Am. Jour. Physiol., Sept. 1, 1903) found that rennin inhibits the gastric digestion of milk proteids, but that rennin ash does not possess this inhibitory action. This effect of rennin upon the digestion of milk proteids is not modified by preliminary contact with pepsin solution at 40° C. for one-half hour. Paracasein is somewhat more difficult of digestion than casein. Rennin also retards the pancreatic digestion of milk proteids in alkaline or neutral solution, but has no inhibitory action upon the gastric digestion of fluid egg-albumin.

Respiration Experiments in Phloridzin Diabetes.—In a series of calorimetric investigations, A. R. MANDEL and G. LUSK (Am. Jour. Physiol., Sept. 1, 1903) sought to solve the question, does the diabetic burn more fat than the normal organism under similar dietary conditions, or does the increased proteid combustion supply the additional power necessary for his organism? They find that the calorific energy lost through the urine in the form of sugar is made up, not by increased combustion of fat, but by the rise in proteid metabolism. In a diabetic dog, whether he be fasting, or fed on meat alone, or on fat alone, or on meat and fat together, no more fat is burned than in the same dog when he is normal and fasting. After the injection of 5 gms. of phloridzin subcutaneously, as much as 60 per cent. of the phloridzin carbon may be eliminated in the urine. In the early stages of diabetes due to phloridzin, the carbon in the urine derived from oxybutyric acid or other abnormal products except sugar (and phloridzin itself), appears to be negligible.

Digestion Leucocytosis.—The exact nature of digestion leucocytosis and its true meaning have never been satisfactorily demonstrated, nor has the question whether the spleen plays any part been considered. In studying digestion leucocytosis in normal and in spleenless dogs, A. GOODALL, G. L. GULLAND, and D. N. PATON (Jour. of Physiol., Aug. 24, 1903) found that during digestion a slight preliminary fall in the total number of leucocytes in the circulation may occur. Differential counts show no constant corresponding alteration. A fairly regular rise in the total number of leucocytes then follows and reaches its maximum in about four hours after food. Digestion leucocytosis is not affected by removal of the spleen. The increase is due (*a*) to a lymphocytosis which is very constant as regards its incidence and its degree, and (*b*) in the majority of cases to a polymorphonuclear leucocytosis much more variable in its degree. The eosinophile cells show very little change. The number and varieties of white cells in corresponding mesenteric veins and arteries during digestion are similar, and resemble those in the general circulation. Pohl's conclusion that they are produced in the intestinal wall is thus negatived. The authors were unable to detect signs of increased activity of the lymphoid tissue of the intestinal wall, and this appears still further to oppose the conclusion of Hofmeister and Pohl.

The Effect of Lecithin on Growth.—In a series of experiments performed on white rats, S. HATAI (Am. Jour. Physiol., Sept. 1, 1903) found that the animals which received the lecithin by either injection or feeding, gain in body-weight more rapidly than those which did not receive it, the gain in the experimented rats being on an average 60 per cent. greater than in the controls; the relative weight of the central nervous system in the lecithin rats was normal; the nervous system in the experimented animals contains the same proportion of solids and water as in the centrals; this is another indication of the normal character of the growth. The area of the axis-cylinder to its sheath in the nerve fibers of the experimented rats is approximately the same as that in the centrals, showing that the peripheral nerves have also grown normally. The rats which received the lecithin show a greater power of resistance to the unfavorable changes in the surroundings. The author's investigation confirms strongly the previous observation of Danielewsky, Desgrey and Zaky, and others who claim the physiological effect of the lecithin to be that of a stimulating agent for normal growth.

Reflex Pupil-dilatation.—After section of the third nerve, according to H. K. ANDERSON (Jour. of Physiol., Aug. 24, 1903), dilatation of the pupil may be readily excited by tactile and pathic stimuli, but the dilatation ceases when the cervical sympathetic is cut also. No evidence has been obtained of efferent fibers to the iris except those in the third and sympathetic nerves. No constriction of the pupil was caused after section of the third nerve, either by variations of the light or other sensory stimulation. There was therefore no evidence of inhibition of the central sympathetic tone of the dilatator. After section of the third nerve rhythmical variation of the size of the pupil may occur (hippus). This may sometimes be excited by tactile stimulation of the skin around the eye or by increasing the dose of ether and chloroform. The rhythm ceases at once on section of the sympathetic nerve. After section of the spinal cord below the bulb stimulation of the central and of the sciatic nerve still causes slight pupil-dilatation, retraction of the nictitating membrane, and separation of the eyelids.

NEUROLOGY AND PSYCHIATRY.

Aphasia after Scarlet Fever.—Disturbances of speech are rather rare complications or consequences of scarlatina, and some authors fail to mention them at all. Statistics of such proportions as 6,000 cases of the disease in the St. Petersburg City Hospital; 3,000 cases in the Children's Hospital, and others do not contain a single case with such complications. The case reported by S. N. CHEREPIN (Prakt. Vrach, No. 34, 1903) was that of a little girl of five years in whom the attack of scarlatina was rather of a severe character, with distinctly pronounced typhoid symptoms. On the tenth day of the disease while perfectly conscious she lost the power of speech. Examination of the nervous system elicited paresis of the right arm and leg. She understood what was said to her and responded by various movements, opening her mouth, protruding the tongue, etc. She was entirely unable either to speak at will or repeat anything spoken to her, or produce any articulate sound. These disturbances lasted for a few days when they disappeared gradually. Patient began first to move her lips, and later produced articulate sounds, and on the seventeenth day the power of speech was restored in its entirety. This symptom complex of disturbed speech in combination with paresis points to an affection in the region of the left frontal convolution, in its posterior portion, the motor center of speech, and further in the direction of the internal capsule. The affection bears the character of cortical motor aphasia due likely to a more or less extensive hemorrhage or embolism, more probably the latter. On the other hand, it is possible to assume the whole clinical picture as one of motor subcortical affection.

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No. 111 FIFTH AVENUE, NEW YORK.

Subscription Price, including postage in U. S. and Canada.

PER ANNUM IN ADVANCE	$4.00
SINGLE COPIES	.10
WITH THE AMERICAN JOURNAL OF THE MEDICAL SCIENCES, PER ANNUM	8.00

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LEA BROTHERS & CO.,
No. 111 FIFTH AVENUE (corner of 18th St.), NEW YORK.

SATURDAY, NOVEMBER 7, 1903.

EXERCISE AND DETERIORATION IN TABES.

IN recent years tabes dorsalis or locomotor ataxia has become so frequent in this country as to demand that every general practitioner shall be able to recognize it early and shall know whatever is recent in medical knowledge as to its causation, its prevention, if possible, and of the measures of treatment advisable to keep it from progression too rapidly in its uncomfortable course. The most interesting contribution to the etiology of tabes in this country is the general conclusion among authorities on the subject that the negro is less liable to the disease than is the white. This has been used by some as an argument against the syphilitic origin of tabes, since, as is well known, the black race, in this country especially since the days of slavery, has been particularly subject to venereal diseases and has always suffered from syphilis in a larger proportion than the white population. The fact that tabes is actually less frequent among the negroes is brought out in an article by Dr. D'Orsay Hecht, in the October number of the *American Journal of the Medical Sciences.*

Professor Osler, in answer to a question in the matter, gives the statistics of Johns Hopkins Hospital. There have been 20 cases of tabes under observation during the last fourteen years while Johns Hopkins Hospital has been open. Of these only one was a full-blooded negro and one a mulatto. The average proportion of white and colored under treatment at the hospital is, as might be expected from the population of Baltimore, much higher than this. In Philadelphia, the rarity of tabes among negroes is very remarkable. In the nervous dispensary of the University of Pennsylvania not a single case of the disease has been seen in a negro for eight years. For more than fourteen years not a single negro suffering from the disease has applied for treatment at the infirmary for nervous disease. Dr. S. Weir Mitchell is credited with saying that he has seen altogether but four cases of tabes in the colored race and two of these were patients of mixed black and white blood. All the statistics show that even a small infusion of white blood seems to be enough to make the individual much more liable to tabes than if he were pure negro.

All of this with the well-known susceptibility of the negro to syphilis and the actual frequency of the disease might seem to argue against the etiological connection of syphilis and tabes.

There are considerations, however, that distinctly lessen the apparent force of this argument. Syphilitic affections generally of the nervous system occur among those particularly who have a bad family heredity and who are exposed to the emotional stresses and strains of an active competitive life. Probably the best prophylaxis against the development of nervous syphilis, especially where a family history of nervous conditions in near relatives argues for a distinct predisposition in this direction, is for the patient to take up a quiet easy-going life as far as possible removed from emotional strains. The social condition of the negro in this country has, as a rule, been such as to protect him from the bad effect of severe emotions on the nervous system as he has been very little liable to the serious disappointments of those in higher social stations.

It is generally recognized too, at the present time, that while syphilis is the most important predisposing factor in the development of tabes dorsalis it is not the only etiological element and usually needs the presence of some one or more direct causative agents. Exposure to extremes of cold and the encountering of severe fatigue seem to be particularly productive of tendencies to the degeneration of the nervous system characteristic of the disease. The negro race is very little prone to subject itself to the severe fatigue or to suffer the extremes of temperature that are so often found in the history of tabes dorsalis.

A very interesting commentary on the connection between overexertion and tabes is to be found in the opinions expressed by good authorities with regard to the reason for the paradox so often noted in the disease that if the optic nerve is atrophied early there is very little further degeneration of tabetic character. Edinger called attention to the fact that changes not unlike those known in the cord as tabetic might be produced in animals by tempting them to overexertion. Mice were placed in a position in a revolving cage that required them to exert themselves constantly for several days. The result was a series of quasitabetic changes in their spinal cords. Applying the principle thus discovered to the fact that the blind patients do not suffer from further progress of their tabetic degeneration Edinger considered that it was probably due to the fact that in their blind condition they were not able to use, and especially not in a position to abuse, their muscular and nervous strength.

The lesson of the discussion consists in the advisability of warning patients who show the initial symptoms of tabes, especially so long as the disease has the slightest tendency to progress that they must be extremely careful with regard to the amount of exertion they permit themselves to undergo. It would even seem doubtful whether they should be encouraged to go around much on their feet at all. Of course, after a time, tabes enters upon a period of inactivity, then a certain amount of exertion may be allowed until the first warning symptoms of further progress. The main part of the treatment of the disease, however, evidently must consist in early bringing home to patients' minds the necessity for a life as quiet as it is possible to make it and without any of the ambitions that up to that time have constituted the main objects of their thoughts and their aims in life. It is indeed a difficult remedy. But the sooner the lesson is learned the better for the patient and the more satisfaction will the physician have in the consciousness of having prevented further progress of the disease.

CHOLECYSTITIS.

THE surgery of the biliary tract is at present the center of the liveliest interest in surgical circles all over the world. At the same time infectious diseases of the gall-bladder and ducts are now attaining the same prominence in medical circles that their surgical affections have reached for the surgeon. Cholecystitis is at the present moment the most interesting disease that physicians generally have under consideration. There seems no reason to doubt that in the next few years it will occupy a position in the minds of even the general practitioners almost as prominent as that of appendicitis. There are many similarities between the two diseases and it is probable that their history would develop in a corresponding way. The gall-bladder occupies for the upper right quadrant of the abdomen a position very similar as regards pathology, symptomatology and possible fatal complications that the appendix does for the lower right quadrant. It is very curious to realize that for both these organs notwithstanding innumerable autopsies during the past century, there was a total neglect to recognize the pathological significance of infectious processes arising within them and spreading to other organs with fatal results.

Dr. Musser, in his discussion of acute and chronic cholecystitis, before the New York State Medical Association (see proceedings of the meeting in this week's MEDICAL NEWS, p. 908), called attention especially to this parallelism of symptomatology between acute cholecystitis and appendicitis. He expressed the opinion, now very commonly held, that cholecystitis is about to prove to be a much more common disease than has been suspected. As was formerly the case with appendicitis, it has been masquerading under the guise of other affections. Gall-stones particularly have often been assumed to exist when the condition was really an acute inflammation of the gall-bladder and of its ducts, though the occurrence of true gall-stone colic later on in the course of the affection seemed to confirm the truth of the early diagnosis. As a matter of fact, however, gall-stones are usually secondary to an infection of the gall-bladder, as has been demonstrated by many observers in recent years and the deposition of the salts of bile in the form of these concretions is really a protective effort on nature's part against infectious material. In the center of gall-stones there is practically always found a mass of bacteria—the remains of the previous infection.

As the result of the study of appendicitis in recent years, the so-called idiopathic peritonitis, or peritonitis supposed to be due to cold and other indefinite causes has become very much more limited in its frequency than has been hitherto the case. The similar limitation seems sure to follow a more accurate study of catarrhal jaundice. It has been assumed that in most cases in which jaundice occurs without preceding biliary colic the stoppage of bile is due to a simple inflamma-

tory swelling of the gall-ducts. The more carefully observations are made, however, and the more opportunities are afforded for the direct study of the condition by early surgical intervention the more clear does it become that the affection is really a true cholecystitis extending at times also to the gall-ducts and due to the presence of some infectious agent in the biliary tract. It seems not unlikely that the name catarrhal jaundice will eventually be as satisfactorily eliminated from medical literature as is at the present time the term idiopathic peritonitis.

Acute cholecystitis occurs most frequently in some etiological relation with the typhoid bacillus. A true cholecystitis may usher in an attack of typhoid fever and for a time mask the symptoms of the underlying general infection. On the other hand acute cholecystitis may follow typhoid fever and such a sequence, in the opinion of good authorities, is much more frequent than has been thought. Dr. Musser did not hesitate to say that in many reported cases of supposed relapses of typhoid fever the patient is really suffering from cholecystitic sequelæ of typhoid fever. In these cases the temperature is often reported as running an anomalous course and not following that characteristic of typhoid fever. There is an evening rise of temperature with a morning remission that amounts almost to an intermission so that the temperature curve of many supposed typhoid relapses resembles that of true septic fever. The presence of tenderness and pain over the gall-bladder shows the condition to be a posttyphoid cholecystitis.

Unfortunately for cholecystitis as for appendicitis, a fatal termination coming without much warning, is not very unusual. Gangrenous types of cholecystitis rapidly lead to perforation followed by peritonitis and death. In these cases of gangrene of the gall-bladder, there is likely to be a remission of symptoms just as the gangrene sets in, which is very delusive. The physician may consider that his patient is actually improving when the hopeless stage of the disease has become a reality. As has been our experience with appendicitis, it is evident that a more intimate knowledge of its early conditions will result in a greatly diminished mortality from cholecystitis. Early operations, while not as necessary as in appendicitis, are often absolutely required in order to save life. The affection cannot be considered a strictly medical disease when in severe form but is rather of the mixed type, which demands the presence of a surgeon in consultation and the armed expectancy that has been found so satisfactory against appendicitis in recent years. It is interesting to realize that much of the advance in this subject has come from American physicians and surgeons, as is also true in appendicitis and that in the near future much more may be looked for from the same source.

THE RESUSCITATION OF THE HEART.

IT has ever been an ambition of the physiologist to start up a once stilled heart. With each succeeding generation of laboratory investigators the mysteries of the mechanical features of the heart beat have been probed with increasing depth and more and more of the principles have been reached and given over to experimental investigation.

To be able to compel the cardiac mechanism to go through its cycle after many hours and even days of apparent quiescence has been the fortune of Dr. A. Kuliabko, who may be said to have inaugurated a new epoch in heart physiology. He has been able to restore the heart action forty-four hours after ordinary death.

This author maintains that it is necessary to attribute to mammalian tissues a greater vitality and a greater ability to survival after somatic death than earlier investigations have seemed to indicate. In continuing his researches in this field, Kuliabko obtained certain surprising results (*Pflüger's Archiv*, July 24, 1903). He succeeded in arousing spontaneous pulsations in the freshly cut-out hearts of rabbits and birds, in some instances at least in certain regions of the heart, not only two days after the animal's death, but as much as three, four and even five days. In connection with these experiments he confirmed the observation of Engelmann that, whereas the different parts of the heart act synchronously, yet each part dies separately. The portions of the heart he has found cease beating in the following order: Left ventricle, right ventricle, auricles and mouths of the venæ cavæ. Recovery of pulsation takes place in the reverse order.

He has obtained rhythmical contractions of portions of the heart of a rabbit five days after its death from disease, these contractions being aroused by the circulation through the heart of Locke's solution. In the case of a guinea-pig that had died of enteritis the heart gave evidences of vitality seven days after the animal's death, all of which tends to show that in spite of the ravages of disease, the heart muscle still preserves a cer-

tain supply of energy after death. The more time that has elapsed after the death of the animal, the longer it takes to evoke signs of cardiac action by means of an artificial circulation. The presence of coagula in the heart and in the coronary vessels does not appear to interfere with the restoration of cardiac activity.

The interest of physicians rests mainly upon the practical application of these experiments, in which the author sought to arouse the activity of the human heart. It is needless to state that other investigators have succeeded in doing this in the case of hearts removed from individuals executed by hanging or beheading, but these hearts had been removed from the bodies immediately after death. Kuliabko confined his experiments to cases that had died in the hospital from various causes, in which some time after death the heart was removed, placed on ice and taken to the laboratory. The hearts were principally those of children.

The first successful result was one in which the author obtained pulsations in the heart of a child who had died twenty hours before from a double pneumonia, and in which these pulsations were kept up for one hour.

The ease of cardiac resuscitation he has found depends greatly upon the nature of the disease from which the individual has died. Thus positive results of varying degree in the hearts removed from fatal cases of pneumonia, cholera infantum, pneumonia combined with diphtheritic ophthalmia and septicemia, bronchitis combined with peritonitis and meningitis, pneumonia complicated with gastro-intestinal catarrh, and double pneumonia complicated with intestinal catarrh have been obtained. Three cases, left pleurisy with effusion, diphtheria complicated with septicemia and erysipelas gave negative results, which was not due to delay in removing the heart after death.

The nature of the disease also influences the rapidity of onset of rigor mortis in the cardiac muscle, the following rule being apparently maintained, namely, the earlier and the more vigorously cardiac rigor sets in, the less is the cardiac pulsation capable of being revived. But this rule is subject to marked exceptions. It is furthermore to be borne in mind that the rigidity of death is no absolute hindrance to the restitution of the automatic activity of the mammalian heart.

In one of the cases in which the heart had passed into marked rigor, the author was able, by means of the artificial circulation, to reestablish the pulsation of all parts of the heart. He also found that washing out the cardiac vessels with Locke's solution delays or even prevents the onset of rigor. The latter phenomenon is no longer regarded as an index of the total dissolution of the muscular tissue and the irretrievable loss of all its functional properties.

These researches have an extraordinary interest, in that they furnish proof of the wonderful vitality of the heart. It would appear that the cessation of the heart-beat in certain cases of natural death is not the result of an exhaustion of this organ, but is apparently the sequence of the heaping-up in the muscle of the heart, which has also been affected by pathological processes, of the products of metabolism. By removing these products by means of an artificial circulation of Locke's solution, it is possible to reestablish the automatic activity of the heart for a long time.

One is cautioned against concluding, on the basis of these experiments, that it is possible to bring the dead back to life, for this depends upon the resuscitation not only of the heart but also of the other tissues and organs, principally of the central nervous system. As regards the last, it has been proved that the suspension of the circulation in the brain results in almost immediate change in the reaction of the gray-matter, which changes from a neutral or alkaline to an acid reaction. Yet Herzen has succeeded in restoring the suspended cerebral functions in rabbits by means of a renewal of the circulation of the brain. A thorough overhauling of the entire subject of the ability of the various tissues to survive somatic death, is necessary before one can even consider the possibility of starting anew the entire living machinery.

ECHOES AND NEWS.

NEW YORK.

Clinical Lectures in Dermatology.—The governors of the New York Skin and Cancer Hospital announce a course of clinical lectures to be given each Wednesday afternoon at 4:15 o'clock during the winter. These clinics will be conducted by Dr. L. Duncan Bulkley in the out-patients' hall and will be free to the medical profession.

The Craig Colony Prize.—A prize of $200 is offered by Dr. Frederick Peterson for the best original essay on the etiology, pathology and treatment of epilepsy. The award will be made by a committee of the New York Neurological Society and the result announced at the annual meeting of the Managers of the Colony the second Tuesday in October, 1904. The conditions to be complied with are: (1) The paper must show original research work. (2) The subject-matter of the essay shall not have been previously published. (3) The manuscript submitted shall be in English and be sent to Dr. Peterson at

4 West Fiftieth street, New York City, before September 30, 1904. The successful manuscript becomes exclusive property of the Craig Colony. (4) Each paper submitted must be accompanied by a sealed envelope containing the name and address of the author and bearing on the inside a motto or device which is also to be inscribed upon the essay.

New York State Civil Service Commission.—Examinations for Superintendent and for Resident Physician in the New York State Hospital for the treatment of Incipient Pulmonary Tuberculosis.—The State Civil Service Commission will hold open competitive examinations for the above mentioned positions, November 28, 1903, in various cities throughout the State. Intending competitors must fill out application blanks and file them in the office of the Commission before noon of November 23. Applicants will be duly notified of the time and place of examination. Non-residents of the State will be admitted. The requirements and conditions of examination are as follows:

The Medical Superintendent will probably receive a salary of $3,500 a year with quarters and maintenance for the superintendent and his family. The duties of the position are defined by Chapter 416 of the Laws of 1900, which further provides that such medical superintendent shall be a well-educated physician, a graduate of a legally chartered medical college, who has had at least six years actual experience in the practice of medicine, including at least one year's experience in a general hospital. Subjects of examination and relative weights: Experience, education and personal qualifications, 4; written examination covering general medicine; hospital administration; pathology, bacteriology and therapeutics of pulmonary tuberculosis, including dietetics and sanatorium treatment, 3; practical examinations of patients for diseases of the chest, 3. The written examination will be held in any of the cities named on the application on November 28. The practical test will be held at a later date and place (probably Albany), of which candidates successful in the experience and written examinations will be duly notified.

The Resident Physician's salary probably will range from $900 to $1,500 a year with quarters and maintenance. Duties to be prescribed by the medical superintendent under the direction of the Board of Trustees. Candidates must be regularly graduated physicians and have at least two years' experience in the practice of medicine, including one year's actual experience in a general hospital. Subjects of examination and relative weights: Written examination covering anatomy, physiology, materia medica and therapeutics, chemistry, theory and practice, surgery; also a special examination in pathology of pulmonary tuberculosis, in bacteriology and descriptive laboratory methods, 6; practical examination in the physical diagnosis of diseases of the chest, in the examination of sputa, blood, urine, and other pathological material, 4. The written examination will be held in any of the cities named on the application on November 28. The practical test will be held at a later date and place (probably Albany), of which candidates successful in the written examination will be duly notified.

PHILADELPHIA.

Medico-Chirurgical College.—Dr. Judson Daland has been elected Professor of Clinical Medicine at this institution.

Next Meeting of Medical Examining Board.—The next meeting of the Medical Examining Board representing the Medical Society of the State of Pennsylvania will be held in Philadelphia, Industrial Hall, North Broad street, on Tuesday, December 15, 1903, at 2 P.M., and will continue on the three succeeding days.

Allegheny City Will Not be Quarantined.—The clash between the officials of the State Board of Health and the local Health Board in Allegheny City has been adjusted so that general quarantine of the city will not be ordered. It now appears that City Councils upheld the local officials in their partial disregard of measures to prevent the spread of smallpox. When convinced of the superior authority of the State Board they decided to abide by its rules and to make regular reports in the future. Postal authorities and express companies have been notified of the conditions now prevailing in the city.

Pennsylvania Institution for the Deaf and Dumb.—The annual meeting for the election of directors of this institution was held October 28. The report of the Superintendent showed that during the past year 64 pupils were admitted and 59 graduated. The present attendance is 507, said to be the largest number at any similar institution in the world. The erection of a new gymnasium is recommended.

Pennsylvania Hospital.—A tablet to the memory of Stephen Girard and his wife was recently placed in the hospital by the board of directors of City Trusts. It was placed on the south wall of the entrance hall to the hospital and was given in recognition of Girard's bounty to the hospital. It also commemorates his wife, who for more than twenty-five years was an inmate of the insane department and who was buried on the hospital grounds.

Eastern Penitentiary Recommendations.—Following the dismissal of Warden Bussinger of the Eastern Penitentiary in this city comes the report of the grand jury which, after two visits of inspection condemns strongly the existing conditions at the institution and makes many suggestions for improving them. The report includes the following: "First. The accomplishing of a complete and thorough disinfection of the entire plant, it having been found by expert bacteriological tests employed by the inspectors that it is probable that every cell in the institution is infected with germs of tuberculous disease, it being a fact of record that over 60 per cent. of the deaths which have occurred in the penitentiary in the last thirty years have been from this variety of disease. Second. The complete reconstruction of the plumbing system throughout the entire premises. As it is at present, it is hopelessly unsanitary, and must be depressing to the convict's ability to resist the invasion of disease. In the opinion of the jury, nothing short of an entire replacement of the plumbing system would meet the requirements. A system of modern baths should be introduced, the baths at present in use are antiquated, unsanitary and undoubtedly a fruitful source of contagion and disease. In the opinion of the jury, the State should establish and support an institution for the exclusive incarceration and treatment of insane criminals, the penitentiary being totally lacking in proper facilities for the care of criminals of this class. Pennsylvania is sadly behind her neighboring states in this important modern demand. Recognizing the excellence of the system already adopted at the Philadelphia Hospital for the Care of Consumptives we would recommend that similar provisions be made at this institution."

The American Society of Clinical Surgery.—This Society, after meeting in Baltimore on November 13, will come to Philadelphia on November 14 and hold

sessions as follows: 10 A.M., Medical Hall, University of Pennsylvania, where Dr. G. G. Davis will speak on the Teaching of Applied Anatomy. At 11 A.M., in the amphitheater of the University Hospital, Dr. Edward Martin will demonstrate the Effect of Head Positions upon the Epiglottis during Anesthetization, a Mechanical Intestinal Suture, and Percussion and Auscultation in the Diagnosis of Fractures. At noon, Dr. C. H. Frazier will demonstrate Results of Division of the Sensory Root of the Gasserian Ganglion, and Observations upon the Technic of Intracranial Operations. At 2:30 P.M., at the Pennsylvania Hospital, Dr. J. Chalmers Da Costa will speak on Traumatic Hemorrhage from the Lung, Dr. R. G. LeConte on a subject not as yet selected, and Dr. J. H. Gibbon on Diagnosis and Treatment of Perforating Gastric Ulcer.

Hypnotism in the Treatment of Stammering Children.—At the meeting of the Philadelphia County Medical Society held October 28, Dr. G. Hudson Makuen demonstrated on a boy of fourteen years a method which he has used in a number of cases of stammering. The method is simply that of hynotizing the child and then telling him to speak. In many instances this will be done quite readily though it was impossible to obtain speech before. The principle on which the treatment is based is that these children can really talk and will talk if they can be made to believe that speech is possible. They cannot be made to believe this when awake. When hypnotized they will readily believe anything that is told to them and can then be taught to speak. Dr. Makuen stated that in certain selected cases this expedient is undoubtedly a valuable aid and that if hypnotism has any practical value in any class of cases it seems to find its application in the one under consideration. He has employed it in twenty cases with very satisfactory results.

The Importance of the Early Recognition of Deformities.—By invitation, Dr. Reginald H. Sayre, of New York, delivered an address on the above subject and showed a large number of illustrative lantern slides. The speaker said that the old adage of prevention being better than cure was most true in the realm of orthopedics. The Chinese, by the use of patience, care and a bandage produce the most marked deformities in the feet of their children. Why not use the same amount of intelligent attention in the care of existing deformities in infants and change them into natural shapes? If the art of prevention were better understood the unsightly deformities now seen in older persons would not be presented for treatment. In the palsies of children, care should be taken to prevent consequent deformity of bones. The parts should be held in position and kept straight instead of letting them go and doing osteotomies later on. The same is true of spinal curvature. The twentieth century is to be noted for its advance in preventive medicine and Dr. Sayre hopes that it will see an advance in preventive surgery as well. When a mother brings her child to the physician and says there is something wrong with it, the physician must exercise the greatest care before deciding on the case. He should see the child when stripped, and when it has recovered from its fright at the strange surroundings. Under these circumstances he may readily discover a lesion that had at first escaped his notice. Points that call attention to some departure from the normal are elevation of one hip, greater space between the arms and body on one side, the position and prominence of the scapulæ, the distance of the nipples from the umbilicus, the prominence of one nipple, etc. An incipient Pott's disease needs immobilization; lateral curvature due to some other cause, calls for systematic movements. Dr. Sayre says that it is not always absolutely easy to differentiate between these two conditions in their early stages when the diagnosis is of such great importance. In cases of hip-joint disease, pain in the toe is sometimes the first intimation of the affection. Spasm of the muscles of the calf on the same side is an early sign that is often overlooked by the careless physician. If pain in the hip is waited for as a diagnostic sign, then the diagnosis will be made late. The muscular spasm limits motion and prevents pain.

In the discussion, Dr. DeForest Willard said that the experienced physician and the surgeon, as well as the general practitioner, sinned in these cases by not making an early diagnosis. This is due not so much to lack of knowledge as to carelessness. Many patients are not stripped and the condition from which they seek relief is treated as something else, often as rheumatism for example. The fact should be emphasized that rheumatism in a single joint in children is absolutely unknown, unless there be other manifest evidence of that disease.

Dr. Oscar H. Allis said that the importance of stripping the patient had been emphasized by the previous speakers, but it could not be too often mentioned as it was so often neglected or considered unnecessary. Candidates for the United States Army and Navy are stripped absolutely naked and private patients are entitled to the same consideration. He referred to the great etiological importance in lateral curvature of the spine of children sitting in a certain position in school. If he had the power, he would make every child in school use his right hand on Monday, the left on Tuesday, and thus alternate through the week until Saturday and Sunday when the child could use either hand it chose. Teachers are beginning this expedient to some extent but it should be universally enforced. Dr. Allis stated that a perfectly symmetrical spine is never seen in an educated person.

New System of Medical Inspection.—The reorganization of the entire system of medical inspection of Philadelphia as advocated by Director Martin has been approved by committees of Councils and the necessary appropriation endorsed. Dr. Martin's purpose is to place at the head of each of the 50 districts into which the city is to be divided a competent medical inspector, with a salary sufficient to pay him for his full time, who is to be held responsible for the condition of his district. In his hands are to be placed the duties now divided among the vaccine physicians, district physicians and medical inspectors. In place of 36 vaccine physicians, who give a portion of their time, 50 district physicians who attend the sick poor, and of 13 medical inspectors of contagious diseases, these 50 medical inspectors will be responsible for vaccination, treatment of the sick poor and contagious diseases. In addition to this corps of inspectors there is to be organized a corps of 20 visiting nurses, always ready to receive the department's assignments to homes where their services are urgently needed, but where circumstances would preclude the aid of hired trained nurses. These nurses will at other times be employed in visiting public schools to look after the welfare of pupils. A further step will be the organization of a corps of 12 meat and cattle inspectors to perform the duties now attempted by three inspectors. The trio of inspectors now at work are under the Department of Public Safety. Both Director Martin and Director Smyth agree that this

small force cannot carry out the purpose of its existence satisfactorily, and Director Smyth has approved the plan to have the inspection of meat and cattle transferred to Dr. Martin's department. The number of assistant inspectors of milk is likewise to be increased from four to eight. In pointing out the improved service which will be given under the proposed consolidation and reorganization, Director Martin called attention to the fact that the cost will not be much greater than it now is, with divided and to some extent irresponsible forces. The suggested salary for the medical inspectors was $1,200 each, of the visiting nurses $750 each, the meat inspectors $1,000 each, and the inspectors of milk $1,020 each, including car fare. Homeopathic physicians, in numbers corresponding to their proportion in the city, will be appointed on the new staff of inspectors.

CHICAGO.

Diphtheria Increasing.—This disease continues to increase, 106 cases being reported, compared with 89 during the previous week. The northwest section of the city is most affected, but reports come from all parts of the city. Scarlet fever, measles and whooping cough are at a minimum.

Pneumonia.—The Health Department, in its bulletin of Oct. 24, calls attention to the fact that the community is again facing the beginning of the murderous pneumonia season. Between the last of this month and the close of next May upward of 2,100 persons will die of pneumonia in Chicago, while from consumption, which is practically monopolizing the attention and efforts of the laborers in the field of preventive medicines, there will hardly be more than 1,300 deaths during the same period. Since the beginning of the last great pandemic of influenza, in 1889, there have been 33,861 deaths from pneumonia in this city and 29,980 from consumption—an excess of 11.4 per cent. of pneumonia mortality. During this period, that is, the last thirteen years, 1890-1902, the deaths from pneumonia have increased from an average of 117 in the 100,000 of population during the previous thirteen years, 1877-1889, to 179—an increase of nearly 53 per cent. Corresponding figures for consumption are 171 per 100,000 in the first period, and 160 in the second—a decrease of a little more than six per cent.

To Aid Sick Children.—At a meeting of the Children's Hospital Committee it was announced that arrangements had been completed making it possible for any parent of a sick child, or for any physician, to ascertain at any time what accommodations could be secured for children at any hospital in the city. The society intends from this time on to maintain an information bureau of this character at its headquarters. Hospitals will report to the bureau every day, filing full information concerning the number and location of beds available for children, and physicians who make a specialty of treating the diseases of children will also report to the bureau, so that they may be reached at any hour of the day or night. All information on these subjects will be supplied to the general public on application in person or by telephone. It was also announced at the meeting that the accommodations at the Crippled Children's Home had been increased by sixty additional cots through the efforts of the society.

Septic Endocarditis.—At a meeting of the Chicago Medical Society, held Oct. 21, Dr. R. S. Dubs read a paper on this subject, and presented microscopical and macroscopical pathologic specimens of the case, which was of great interest, because of a complete history from the patient's first sickness to his death. Patient's mother had been afflicted with rheumatism for ten years or more. Patient himself, a man of thirty years, had enjoyed the best of health previous to his first attack of rheumatism in the fall of 1902. During this sickness, which yielded fairly well to the salicylates combined with the alkaline treatment, there was a slight systolic bruit at the apex, noticed only now and then. In the winter of 1903 he had a second attack of rheumatism, subacute in character, and lasting several months. As in the former attack, the slight bruit was again noticed at times. In March, patient went to Mount Clemens, and came back apparently cured. While there he injured his left elbow, and had an open discharging wound for several weeks. The wound did not heal until he had been back in Chicago for several weeks. In the beginning of May, 1903, he was taken with chills and fever. For two weeks his sickness gave a picture of a sepsis. Nothing pointing to a more definite location of the sickness than the systolic bruit heard at the apex of the heart. The absence of malarial plasmodia and the failure of quinine excluded malaria. The irregular pyrexia with rigors, the polynuclear leucocytosis, made a sepsis very probable. The first embolic process was noticed in the third week, in that pus and blood were found in the urine after a chill. This, in connection with the systolic bruit at the apex, fairly well established the diagnosis of septic endocarditis. As the sickness advanced, dilatation of the heart became more noticeable. On the twenty-fifth day, during a severe chill, the right anterior valve of the aorta was ruptured. The sudden incompensation thrust upon the heart gave rise to most distressing symptoms. On the thirty-first day of the sickness a pericarditis was ushered in under symptoms of great cardiac distress and collapse. The dilatation of the heart was extreme, and the post mortem showed that it extended from the right mammillary line to the left side of the thorax. The microscopical examination showed the presence of streptococci in the varicosities of the aortic valve, also beginning organization of their fibrinous manes. The interesting features of the case were, first, that we have a lesion of the aortic valves only, whereas the systolic bruit was heard at the apex alone for many weeks and was always loudest there. Second, that the aortic valves alone were affected, no other valves being embraced in the ulcerative process. Third, the clinical picture would seem to show a marked difference between a rheumatic endocarditis and a septic endocarditis. If, as has been presented, the septic infection of the valves was subsequent to the diseased condition caused by the rheumatism, we would consider the bacteria as having found entrance through the open wound of the left elbow. If, however, it be taken for granted that the cause of the heart trouble was due to the streptococci found in the post-mortem examination, from the time the first systolic bruit was heard, in the fall of 1902, it would be difficult to explain the joint symptoms in any other way than that they were caused by these same streptococci. That these joint lesions caused by streptococci should be affected by the salicylates is contrary to clinical evidence. This would seem to establish the fact that in this case the endocarditis during the attacks of the rheumatism was due to another agency than the streptococci found upon the valves in the post-mortem examination.

Can an Ophthalmic Examination Aid the Life Insurance Examiner in his Work?—Dr. George F. Suker read a paper on this subject before the October meeting of the Medical Examiners' Association. It was a potent fact that none of the present day

life insurance companies ever demanded even a cursory examination of the eye. Only one question in reference to the eyes was ever asked, namely, How is your sight? And no pretense was even made to verify the veracity of the answers given by the applicant. It mattered not whether the answers given corresponded to the actual anatomicopathological condition of the eye or not. So long as the applicant claimed to have so-called normal vision, and met with other lax requirements, he was accepted as a good risk by every company. Nevertheless, this very applicant might present some latent ocular lesion, which, if it had been recognized, would have rendered his acceptance very doubtful, as the eye symptom was but a local expression of a serious systemic dyscrasia. The insurance companies did not appreciate the tangible clues to be derived from an ophthalmologic examination, because the very heads of their medical department, who, with strict propriety and dignity, one could safely designate as belonging to the old school of medicine, were themselves incapable of valuing such an examination as it ought to be. In a large measure, this deficiency was due to the lamentable fact that in many schools, and not so very long ago, ophthalmology was a sadly neglected study, both on part of the teacher and the student. This defect, however, was rapidly being corrected in the schools, and now the department heads could not plead ignorance as to the true value of an ophthalmic examination and its scope of applicability in insurance examinations. In insurance work, the examiner must diagnosticate the applicant, and then prognosticate for the company as to the life expectancy of applicants. The examiner should avail himself of all methods of examination and precision. The company should accord him this extra latitude of examination, and allow him an appropriate compensation. Especially should he be permitted this freedom in all dubious cases, as it was certainly an additional safeguard to the company in many instances. On the other hand, this additional precaution might not be of profit to the agent, should an apparently acceptable applicant be turned down, because the eye examination distinctly proved him an undesirable risk. Frequently all physical and laboratory examinations were apparently negative, yet an ophthalmic examination would reveal conditions which no company could countenance in an applicant. No insurance company would knowingly issue a policy to a syphilitic or one with even a trace of albumin (serum or nuclear), or sugar, be it functional, organic, temporary, or permanent. Nor would this same company issue a policy to any person with valvular heart lesions or incipient serious cardiovascular changes; yet this very company would accept men, who, for example, were decided apoplectics or incipient tabetics, with reduced life expectancy, would escape detection save for an eye examination. If the companies would be more scientifically elastic with the urinary data and place some credence in this regard in ocular findings, many an injustice toward the prospective policy-holder would be obviated. The author pointed out in what particular cases an eye examination would prove of value.

CANADA.

Improvements to a Winnipeg Hospital.—Sister Superior Hemel of the Grey Nuns at Montreal has approved of plans for a four-story addition to St. Boniface Hospital, Winnipeg.

New Dean of Queen's Medical Faculty Appointed.—Dr. J. C. Connell, M.A., of Kingston, has been appointed Dean of the Medical Faculty of Queen's University in succession to the late Dr. Fife Fowler.

Consumption Sanitarium for British Columbia.—The Ministerial Association of Vancouver, B. C., has entered upon a project which has for its purpose the establishing of a consumption sanitarium in that province. Toward this end a provincial association will be at once formed.

Controlling Infectious Diseases in British Columbia.—The department of public health in the province of British Columbia has issued leaflets containing information on the common infectious diseases. These are for distribution among the school children of the province and the object is to make the parent more familiar with these diseases. The system will provide for a daily report from the teachers regarding pupils absent through illness. In this way the health authorities hope to control epidemics in their initial stage.

Toronto Dispensary.—According to the annual report of the Board of the Toronto Dispensary there were 13,000 of the sick poor of Toronto treated in this institution during the past official year. The work carried on at this institution has far outgrown the present accommodation; and a movement is on foot to erect new and more modern buildings. Already several donations have been received toward this end.

The Spitting Nuisance in Montreal.—Dr. Laberge, Medical Health Officer of Montreal, reports that for some time past his department has been conducting an active campaign to prevent the practice of persons spitting in churches, theaters, halls, etc. Ministers and priests of congregations have promised to publicly ask their congregations to do all in their power to abate the unpleasant custom. Many petitions have been sent in to the Health Department asking that everything be done to suppress the filthy practice.

Olympic Games.—Dr. Tait McKenzie of the anatomical department of the medical faculty of McGill University, Montreal, has been appointed chairman of the Canadian Committee for the St. Louis World's Fair Olympic Games.

Resignation.—Dr. William Bayard, of St. John, N. B., one of the oldest medical men in Canada, has handed in his resignation as chairman of the New Brunswick Board of Health. For more than forty years Dr. Bayard was a member of this Board of Health. It is understood the cause of the resignation to have been differences arising with the secretary of the Board over certain smallpox cases in New Brunswick.

Hospital Superintendents.—Dr. Charles O'Reilly, medical superintendent of the Toronto General Hospital, attended the annual meeting held recently at Cincinnati of the Association of Medical Superintendents of Hospitals of the United States and Canada, of which he is vice-president. When Dr. O'Reilly and the other Canadian delegates came into the meeting they had the extreme gratification of hearing the orchestra play "God Save the King," as a compliment to their British guests.

Queen's Medical Jubilee.—The Medical Faculty of Queen's University, Kingston, Ontario, celebrated their jubilee on Oct. 15 and 16. The occasion was also noteworthy as the time of the installation ceremonies of the new principal of the University. Among the old graduates of Queen's who were present to be honored by the degree of LL.D., were Dr. H. H. Chown, Dean of the Medical Faculty of Manitoba University, Winnipeg, and Dr. Vincent N. Moore, Brockville, Ont., representative of Queen's on the Ontario Medical Council. Sir William Hingston, Montreal, Dean of the Medical

Faculty of Laval University, was also a recipient of his honor.

New Western Hospital for Montreal.—At the regular quarterly meeting of the Board of Governors of the Western General Hospital of Montreal, held last week, it was announced that a new hospital would probably be erected in the spring, and that it would provide accommodation for at least 100 patients. The building would cost in the neighborhood of $100,000. The report of the medical secretary was read and it showed that during the past quarter 146 patients had been received into the wards, while in the outdoor departments there had been 1,941 consultations.

GENERAL.

King Edward VII. Sanatorium.—On Tuesday last the foundation stone of King Edward's Sanatorium for tuberculous patients in England was laid at Lord's Common, Midhurst in Sussex. This is the site selected for this million-dollar sanatorium, made possible by the endowment from Sir Ernest Cassel, and is about 65 miles from Waterloo Station. The King made a brief speech. He said he had decided to expend the amount of the donation in the erection of an open-air establishment, in the hope of arresting the malady and advancing knowledge on a matter of such infinite importance. Fresh air and sunshine were necessary, and the sanatorium would provide all the accommodation necessary for people of slender means.

A Layman's Interest in Anatomy.—It is related that Dr. Nuhn, the professor of anatomy, at Heidelberg, was much surprised one day when a banker, usually haughty and unsociable, came and sat with him in a railway car, and, after a pleasant chat, asked him all sorts of questions, especially about the anatomy of the heart. The next day he even called, by permission, in the medical department, and watched the professor dissecting one of those organs. Then he drove home, and a few hours later it became known that he had committed suicide by skilfully plunging a dagger into his heart.

Belladonna Poisoning in a Hospital.—The State Board of Charities and the hospital authorities have not yet found a satisfactory explanation of the accidental poisoning with belladonna of 11 inmates of the State Hospital at Tewksbury, Tuesday night, October 27. Dr. Irish, who is a member of the medical staff of the hospital, says that of the 50 men in the ward only 11 were receiving medicine, and only these 11 were poisoned. He has been able to learn of no motive on the part of any of the patients that would lead to the poisoning, and admits that the case is a mysterious one. The patients who received the poison are reported as showing continued improvement.

Meeting of the American Public Health Association.—At the thirty-first annual meeting of the American Public Health Association, held at Washington, D. C., last week, Gen. George M. Sternberg, Surgeon General, United States Army, retired, delivered an address in which he said the great prosperity of some of the Southern States during recent years had been due to their protection from yellow fever, which formerly operated as a serious barrier to industrial and commercial progress. Dr. D. E. Salmon of the Bureau of Animal Industry, Washington, said clinical evidence, statistics, and experiments all favored the conclusion that bovine tuberculosis was a factor in human tuberculosis. The fact that 25 per cent. of the cases in children investigated by the German commission and 50 per cent. of similar cases investigated by de Schweinitz of Washington showed animal infection was sufficient to prove the necessity for measures to be taken to guard against infection of children through milk. Dr. John Guiteras of Havana, said that although in Cuba the invariable custom was to boil milk, he believed tuberculosis in Cuban children was as frequent as anywhere else.

Car Sanitation.—The Committee on Car Sanitation of the American Public Health Association, reported through Dr. J. N. Hurty of Indianapolis. The railway car, he declared, was a potent factor in the transmission of consumption. The consensus of opinion was that the air in sleeping cars became vitiated and was a fruitful source of disease. Dr. J. H. McCormick of the State Board of Health of Kentucky declared that an official investigation into the subject made by him disclosed the fact that the blankets were cleaned only once every six months. Dr. C. B. Dudley of Altoona, Pa., chemist for the Pennsylvania Railroad Company, demanded that the delegates furnish him the data on which they based their statements. The cleaning of cars in transit he characterized as one of the most annoying things railroads had to contend with. He said his company had tried various schemes for sterilizing the drinking water in cars, and had resorted to formaldehyde in disinfecting them. He assured the delegates that the railroads were ready to utilize any practical system that would contribute to the general public health. He admitted that the Pullman car was "still in the dark ages," and that railroad men did not know how to properly ventilate a sleeping car.

Ethics of Professional Publicity.—English physicians are at present much exercised over a new rule proposed by the British Medical Association's committee on professional ethics. Hitherto, while no physician owning the degree of M.D.—in England a medical practitioner is not necessarily a doctor—may advertise in the newspapers, it has been the custom there as here for the press in giving an account of any interesting case to mention the names of the attendant physicians. The Association's ethical committee now desires to forbid this, except when the patient is of the royal family.

Extermination of the French Race.—A special correspondent of a New York newspaper resident in Paris writes to his paper in part as follows: Race suicide is a serious question in France, for the population of the country is decreasing, not by emigration, for very few Frenchmen leave their native country compared with those of other nations, but because the death rate is greater than the birth rate. People are dying faster than they are born. According to the returns of the Bureau of Vital Statistics, there were 25,988 more deaths than births in France last year, and 20,000 less births than during the previous year, while the increase in the number of deaths was 37,052. The record shows only 827,297 births for a population of more than 39,000,000. There was a slight increase in the number of marriages, and a slight decrease in the number of divorces, which fell off from 7,179 to 7,157. There were 16,815 more boys born than girls. In all of the European states as well as in South America, the natural increase of the population is considerable every year. France alone shows a decrease. There must be some remedies for these conditions, which the sociologists are now discussing, and the members of the Chamber of Deputies have had them brought to their attention at every session. There is a considerable increase in the number of immigrants every year. The foreign colonies in Paris are very large. There are said to be 15,000 Americans there, 20,000 Spaniards and a corresponding number of representatives of every nation and every race on earth. But France cannot increase in wealth or industry without a healthy growth of the native population. Among the various remedies to arrest the decay of France it is proposed to offer prizes for large families, the remission of taxes to people who have a number of

sons, the extra taxation of childless families and bachelors, and one interesting plan is to make bachelors ineligible for official positions under the government and municipalities.

Obituary.—Dr. Simon Pollack, aged eighty-nine years, one of the oldest physicians in St. Louis, is dead from senile debility. He was born in Bohemia, and came to St. Louis in 1845. His widow was a sister of ex-Gov. Hoadly of Ohio.

Mr. George Lawson, F.R.C.S., Eng., consulting surgeon to Moorsfields and Middlesex hospitals and surgeon oculist to the late Queen, died in London on October 12 in his seventy-third year.

The deaths of other prominent foreign medical men are announced: Dr. Ernest Pflüger, professor of ophthalmology at Berne; Dr. Domenico Tiboue, 38 years professor of obstetrics and gynecology at Turin; Dr. Ricardo Secondi, professor of ophthalmology at Genoa, and Dr. Tschansson, professor of anatomy at Warsaw.

CORRESPONDENCE.

THE VARIETIES OF LINEÆ ALBICANTES.

To the Editor of the MEDICAL NEWS:

DEAR SIR: There appear to be three different groups of the lineæ atrophicæ to which Dr. Northrup called attention in the interesting paper in your last issue: First, those due to distention of the skin, as in pregnancy (lineæ gravidarum), in ascites, and in consequence of a rapid increase in the subcutaneous fat; secondly, the postfebrile cases, met with particularly after typhoid fever and after scarlet fever; and thirdly, an idiopathic form, seen in both men and women, about the knees, the outer aspects of the thighs, below the crest of the ilium and over the shoulders.

In the first group one occasionally meets with persons who, growing fat rapidly, have become greatly alarmed by the appearance of the ugly-looking, bluish-red scars on the skin of the abdomen, due to fissures in the corium. Some years ago I was consulted by a young man from Milwaukee who had got very stout within three months, and who presented in the iliac regions three or four large, pinkish scars, which had been a source of much uneasiness to himself and to his wife. I have reported an instance of very rapid increase in weight, a sort of acute myxedematous condition, in which the patient gained forty-five pounds in three months. There were extraordinary atrophic lineæ on both sides of the abdomen, one of which was ten inches in length and three-quarters of an inch in breadth.

The postfebrile cases are really very common, particularly after typhoid. Duckworth and others have called attention to them. While, of course, as Comby suggests, in young persons who have to remain in bed for some time and who grow rapidly, the scars may be due to this cause, the fact that they occur in adults after fever shows that it is not necessarily associated with increase in length. They may present an extraordinary appearance, particularly on the back. A friend of mine who had typhoid fever when an adult has his sacral region marked by four or five transverse scars, which were noticed a few months after convalescence. After scarlet fever they may be very extensive. Six or eight years ago I reported the case of a girl, aged seventeen years, who was brought to me from Birmingham, Alabama, on account of the scars which had come in different parts of her body after scarlet fever at thirteen years. It is the only instance I have seen in which they were in situations to be really annoying. Not only were they about the knees and the outer surfaces of the thighs, but there were three or four large ones on the extensor surfaces of each elbow and several about the shoulders. As she was approaching the "low-neck and short-sleeve" period of her life, she was naturally very much distressed about them. Her father insisted that they had increased in numbers within the past two years.

And lastly, there are cases in which one cannot fix definitely upon any cause. The scars are seen chiefly about the outer aspects of the thighs and the shoulders, and they have not the extent of the form due to pressure. At the Saint Louis Hospital, this summer, I was very much interested in looking over the models of the lineæ atrophicæ, and piece No. 1504 illustrates a remarkable case of this form. The atrophic lines came in both breasts without any special increase in the size of the organs, and without the existence of pregnancy.

Yours, etc., W. OSLER.

Baltimore, Md., Oct. 31, 1903.

THE HUDSON VALLEY WATER SUPPLY.

To the Editor of the MEDICAL NEWS:

DEAR SIR: In a recent number of your journal, in discussing the water supply of the Mohawk Valley, you state that the death-rate from typhoid fever in Amsterdam is excessively high and that the city pumps Mohawk water for daily use.

I do not know what is the source of your information, for there is no record of any such facts. In recent years the number of deaths from typhoid fever in Amsterdam—with a population of something like 23,000—has run as follows: In 1899 there were four deaths; in 1900, three; in 1901, five; in 1902, four.

For the last fifteen years Amsterdam has taken its water from streams, going back to the foothills of the Adirondacks. It has a lake up in the wilds of Saratoga County, in an uninhabited district, policed and carried down to the city through salt-glazed earthenware pipes, where it is distributed by a gravity system. The filter beds are yet to be added to complete the system, but thus far, the city has expended about three-fourths of a million dollars upon its water supply.

You were also in error in relation to the water supply of Schenectady. They get their water by driven wells. It has happened about four times since the system has been inaugurated, that during times of drought they have run city water through the distributing pipes—certainly not a commendable procedure, but yet not indicating so bad a state of affairs as you have pictured.

An epidemic of typhoid fever that occurred in Amsterdam in 1898 was explainable by the fact that many people employed in Schenectady, but living in Amsterdam, received their infection in Schenectady; in the record of vital statistics these were charged up to Amsterdam. At the same time there was an outbreak in one of the mills, owing to the use of a spring in the neighborhood that was infected. The spring was closed up by the Health Board as soon as it was discovered.

Truly yours,

Amsterdam, N. Y., Sept. 29, 1903. CHARLES STOVER, M.D.

The Importance of Bitters in Digestion.—Bitters have from time immemorial enjoyed the reputation as remedies that excite the appetite and assist in digestion. To investigate the real nature of the effect of bitters P. J. BORISSOFF (Roussky Vrach, No. 32, 1903) instituted a series of experiments, and as a result found that the bitters tend to sharpen the sense of taste and at the same time increase the quantity of the gastric secretions; the sharpening of taste attains a certain degree, but disappears rapidly. The author speaks against the use of large doses of bitters, administered a long time before meals, or in pills.

SOCIETY PROCEEDINGS.

NEW YORK STATE MEDICAL ASSOCIATION.

Twentieth Annual Meeting, held at the Academy of Medicine, New York, October 19, 20, 21, and 22, 1903.

(Continued from Page 857.)

FOURTH DAY—THURSDAY, OCTOBER 22, 1903.

Diphtheria in the Country.—Dr. J. R. Sturtevant, of Theresa, N. Y., detailed some experience with diphtheria cases in country practice. In a number of cases he seemed to find a definite connection between close association with fowls and the outbreak of epidemics of diphtheria. In one case diphtheria developed in a household, shortly after they moved into a house in which fowls had been kept for some time. In another case, in the country, the fowls on the farm suffered shortly before an epidemic of diphtheria from a membranous affection of the throat. Some of these fowls when dead had been thrown into a cesspool, until the stench became unbearable. In another case the fowls had access to a cesspool and somehow this seemed to be connected with the outbreak of the epidemic of diphtheria in the family.

Antitoxin in Medicine Case.—Dr. Sturtevant considers that the country practitioner who is likely to be called for miles into the country should always carry a supply of antitoxin in his medicine chest. It can do no possible harm, and if needed will do immediate good. Antitoxin is of more value than all the other drugs combined. The physician who does not believe in antitoxin should relegate his diphtheria cases for treatment to some one else. Dr. Sturtevant does not believe in very high doses of antitoxin, 1,500 c.cm. of a concentrated serum, seldom failing to bring relief. If necessary, this may be repeated. For disinfection in the country, Dr. Sturtevant has found the burning of brimstone very effective.

Lack of Sanitation and Throat Affections.—Dr. James J. Walsh, of New York, said that the most interesting problem before bacteriologists at the present moment is the mode of existence of bacilli pathogenic for man, outside the human body. It is possible that diphtheria bacilli may exist in fowls and this has apparently been demonstrated in some cases. However, the mere existence of filth is not of itself sufficient to create a specific disease. The carefully collected statistics of men who work in sewers and sewage disposal, in Berlin, London and Paris, show that these laborers do not suffer, as might be expected, more from intestinal diseases than the rest of the population of the cities in their own class, but they do suffer more from non-specific throat affections.

Large Doses of Antitoxin.—Dr. Stranahan, of Brooklyn, said that in his experience he has found scarcely any effect from 1,500 units of antitoxin in bad cases. If the diphtheria appears to be severe he uses 3,000 units, and six hours later, 3,000 more, if necessary. In one bad case recently he saw no effect even from this dose until the fifth injection had been made. Within two hours after this, the diphtheritic membrane peeled off and disappeared. He has found no special difference in the serums manufactured by different firms or by the State. There should be no hesitation in employing large doses since serum has now been proved, by millions of trials, to be absolutely harmless and the theory on which it is given, supposes that it will neutralize the toxins of the disease present, and they are being constantly produced so long as the membrane continues to exist as harboring material for the diphtheria bacilli.

Dr. DeLancey Rochester, of Buffalo, said that he always employed large doses of antitoxin, and since he has come to recognize the necessity for at least 3,000 units he has no deaths from diphtheria.

Other Treatment.—Dr. Ulrich, of Chester, Pa., said that practitioners of medicine who had had experience in the old days, before antitoxin, realized the value of this new remedy, yet would not give up entirely the older methods of treatment. In the first epidemic of diphtheria he ever saw, on a plantation in Louisiana before the war, in the days when diphtheria was first beginning to be generally recognized in this country, many deaths took place, but the patients that were saved apparently owed their lives to the plentiful use of chlorate of potash and the muriated tincture of iron. Some of the patients that recovered from these attacks of diphtheria, suffered from severe postnasal diphtheritic paralysis after convalescence to such an extent that all liquid food was regurgitated.

Segregation.—Dr. Rice said that the first question that should suggest itself to the country practitioner in doubt as to the nature of a particular disease, but suspicious of its diphtheritic character, should be, if possible, to secure segregation of the patient. Mother and child might well be confined to one room, away from the other children, in the hope of preventing the spread of the disease, or, at least, of limiting it.

Antitoxin and Its Value.—Dr. E. R. Ferguson, of Troy, N. Y., said that before the days of antitoxin, he had seen 75 intubations done without a single recovery. In all cases relief was afforded from the threatening symptoms of immediate asphyxiation, but death took place from diphtheritic bronchopneumonia. Virulent infectious material from the diphtheria in the throat was sure to find its way into the lungs and infect them. Since the days of antitoxin most of these cases recover. It is important, however, to give enough of the diphtheria serum, and as it has never done any harm in the immense number of cases in which it has been employed, physicians should not hesitate as to this.

Antitoxin and the State.—Dr. Sturtevant, in closing the discussion, said that the State furnishes antitoxin not only for the indigent, but for those who are considered too poor to pay for such an expensive remedy.

Tetanus Resolutions.— The Secretary then read a resolution presented by the Mississippi Valley Medical Association, at its recent meeting at the beginning of October (the proceedings of which will be found in the present and also in last week's issue of the MEDICAL NEWS). This resolution sets forth that as the result of the celebration of the Fourth of July, according to the customs now generally adopted in this country, 400 deaths from tetanus resulted. It seems important to limit this annual destruction of young life, and the medical societies of this country are asked to pass resolutions instructing legislators to pass laws forbidding the use of toy pistols, cannon crackers, dynamite bombs, and other dangerous fireworks, whose employment is known frequently to be the forerunner of injuries as a result of which tetanus develops. On motion this resolution was unanimously adopted.

Features of Epilepsy.—Dr. B. Onuf, of Sonyea, N. Y., said that notwithstanding long familiarity with the falling sickness, epileptic attacks are not always so easy to recognize as is often thought. By a study of the 800 epileptics at the Craig Colony at Sonyea he has had the opportunity to note carefully the features of the epileptic attack and has found some of the details different from the classical text-book descriptions. With regard to the initial cry, an erroneous idea prevails that it is a shrill cry, high pitched, loud and a conscious expression of the realization by the patient that

the attack is coming on. As a matter of fact, the initial cry is rather a tremulous groan, of low pitch, somewhat quavering, not expressive of surprise or fear, but due to a spasm of the muscle or larynx. The bleating, trembling character of the sound is due to a slight clonic spasm, which occurs in the muscles before the rigid tonic spasm supervenes.

The Pupils in Epilepsy.—It is sometimes said that the pupils are dilated and immobile during an epileptic attack. This phenomenon is considered to be so constant that it is set down as a pathognomonic differential sign between hysteria and epilepsy. Dilated pupils, however, are not constant in epileptic attacks, and occasionally they have been seen when the case was no more than what would be called hystero-epilepsy. As a rule the degree of dilatation of the pupils is a measure of the severity of an epileptic attack, but there are exceptions to this rule.

On careful observation, Dr. Onuf has seen, just as an epileptic attack began, an extraordinary contraction of the pupils. As the attack gained possession of the patient, however, the pupil jumped to extra width and then remained so dilated. In the stertorous stage the pupils again become contracted and remain so until lethargy sets in.

Reflexes in Epilepsy.—When there is not complete clonic spasm the knee-jerks seem to be exaggerated and ankle clonus is sometimes present. In the convulsive stage of the attack, if rigidity be absent, in Dr. Onuf's experience, the reflexes are more commonly increased than diminished. In general there seems to be considerable individual difference in this matter. In the stertorous stage the reflexes are certainly exaggerated as a rule, unless the patient is sinking into coma, or semicoma. It would seem evident that there is still a field for the study of epileptic attacks, notwithstanding the apparent exhaustion of the subject, because of its frequency.

Traumatic Epilepsy.—Dr. Macpherson, of Leroy, N. Y., described the case of a patient in whom a shot wound was inflicted by a drunken husband a short distance in front of the auditory external meatus. This led to convulsions, frequently repeated during the first few days after the infliction of the wound, but afterward there was complete cessation of the attacks for some months. Traumatic epilepsy had developed, however, and the attacks having become more frequent, Dr. Macpherson was considering the advisability of operating for the patient's relief. Portions of the temporal bone were evidently depressed by the bullet wound and the removal of pressure on the brain would probably bring relief.

Advantage of Immediate Operation.—In closing the discussion, Dr. Onuf said the prospect of operation is much better if done shortly after the injury to the brain, than if the pathological condition which develops after the trauma is allowed to become chronic, when it very often happens that nerve centers are irreparably injured and cannot be made to lose the habit of an epileptic attack. Very often in these cases of supposed traumatic epilepsy, however, careful inquiry elicits the fact that epileptic seizures occurred before the injury. Often these were slight or occurred at long intervals and so were not noticeable. Surgeons must be very careful in giving a good prognosis in supposed traumatic epilepsy, unless they have carefully taken the patient's history and are assured that no previous attacks occurred. Heredity is an important factor in these cases also, and it will often be found that there is direct heredity of epilepsy in the family. Almost needless to say where this is the case the prognosis of operation is by no means favorable.

Perineal Prostatectomy.—Dr. Parker Syms, of New York City, gave the details of a series of cases of enlarged prostate treated with good results by perineal prostatectomy. Sixteen of the patients had been living a catheter life. Thirteen suffered from complete retention, one of them from loss of control with retention. Altogether 26 patients were operated upon, with only one death and 20 satisfactory cures. All of these patients were restored to practically normal urinary functions, though the cases presented every phase of prostatic hypertrophy Three of the hypertrophied prostates were complicated by the presence of calculi. In one of these cases a stone had been removed by a suprapubic operation previously, but another had developed in the prostatic pouch. One of the cases presented a typical pedunculated middle lobe in a prostate that was comparatively small. This patient could not pass a single drop of urine. On the other hand the catheter could be passed very easily, as, of course, it followed the path of least resistance. The case illustrates very well the fact that it is not size alone that represents the main feature of etiology in urinary troubles with enlarged prostate. Often the smaller prostates that are causing trouble are more difficult to remove than large ones. They are not always definitely capsular in arrangement and do not shell out readily. In one case there was a distinct trilobular prostate quite symmetrical in shape This specimen was presented as being very rare not only as a pathological condition, but also because seldom preserved in its entirety during the process of removal.

Operative Technic.—One of the main difficulties in perineal prostatectomy is to be able to bring the prostate well down into the womb. Pressure exerted upon it pushes it away from the operator's finger. For the purpose of dragging the prostate down, Dr. Sims devised a bulb and rubber stem, which is introduced through the membranous urethra after the incision is made. The bulb is dilated with water and thus acts as a firm cushion support for pulling down the neck of the bladder. This enables the operation to be done quickly, completely and with very little loss of blood. The patients operated upon by Dr. Sims were of all ages. Eight were above seventy years, one above seventy-five years and ten from sixty-five to seventy years. The main danger of the operation is not the cutting itself nor the complications likely to ensue in the wound, but the risks due to the anesthetic. Chloroform is usually employed as the anesthetic, because it seems to prove less irritant both to the kidneys and the lungs of these old men.

Thorough Removal.—Dr. Goodfellow, of San Francisco, said that thorough removal of the prostate is important for success in these cases. In more than one case he has removed more than an inch of the urethra in order to be assured of taking away all the tissues that obstructed the urinary passages. As a rule it is not difficult to sweep out of its planes of cleavage the enlarged prostate. Until recently Dr. Goodfellow was of the opinion that all bladders, no matter how much dilated, regained their contractile power when the prostate and the obstacles to the flow of urine it occasioned were removed. He has recently seen a case, however, in which complete atony of the bladder existed and the musculature of the bladder had been so overstretched that it did not regain its power to contract. This patient had thirty-five ounces of residual urine, but had not suffered severely from its presence and complained mainly of frequency of urination. After operation, catheterism three or four times a day had to be continued.

Safety of Perineal Prostatectomy.—Dr. Roth, of New York City, said that after much doubt as to the proper method of operating for enlarged prostate there can now be no doubt that the perineal route is the most

favorable in every way. It is certainly the safest. Five cases with but one death, a mortality of only four per cent. shows how very little danger there is in the operation. The text-books formerly said that the mortality of prostatectomy was 30 to 40 per cent. This deterred many patients from being operated upon and deterred physicians from recommending the operation. As a consequence, operations upon the prostate were done only as a last resort. This will be no longer the case. As a consequence the mortality will fall still lower than before. Years are no contraindication to the operation. Dr. Roth has seen a patient operated upon at the age of eighty-one years, who not only bore the operation well, but had no difficulty from the anesthetic and who recovered promptly and has remained well.

In closing the discussion, Dr. Sims said that as a rule he uses chloroform in his operations because the old bear it so much better. Once and only once he tried spinal anesthesia. The result was so terrifying and so much stimulation was required to save the patient from what seemed impending death that it was never employed again.

Comparative Mortality of Operated and Non-operated Cases.—During the time in which he has been operating upon these 26 patients with one death, Dr. Sims has had under his charge, or has been consulted with regard to at least 20 other patients who refused operation or who could not be persuaded by their physicians to undergo it and who have since died. This feature of the statistics Dr. Sims considers very important. Perineal prostatectomy in the light of these figures is a life-saving operation of great value.

The Eye in General Practice.—Dr. S. Busby Allen, of New York, said that the general practitioner of medicine should have some definite knowledge of eye diseases to enable him to recognize the advance of serious disease in time to refer such cases to specialists for treatment, before irreparable injury has been done to the ocular tissues. With regard to acute glaucoma, the specialists frequently sees cases in which, if the practitioner had tried the tension of the globe he would have realized the necessity for immediate consultation with a specialist in order to have iridectomy done so as to save some vision to the patient. The painful condition of glaucoma, in which the disease is acute, is often preceded by dimness of vision with a rainbow or halo around lamplight. Chronic glaucoma is more difficult to recognize. It occurs in late middle life and may be taken for presbyopia. If sight is not restored by glasses in these persons, or if there is distinct narrowing of the field of vision, or if there is a history of rheumatism in the family, the presence of chronic glaucoma should be suspected and measures of treatment taken accordingly.

Eye Symptoms in Chronic Diseases.—Many chronic diseases present eye symptoms as the first sign. Among these tabes is the most common. One of the most frequent symptoms is diplopia due to the involvement of the sixth nerve. The Argyll-Robertson pupil also occurs but may also be the first symptom in diabetes. A necessity for glasses very early in life should lead to the suspicion of diabetes. Cataract and diabetes are very common. The condition of the pupil is often of important diagnostic value. In tabes and general paralysis there is myosis, or contraction of the pupil. Occasionally the pupil is irregular. In cerebral syphilis there is frequently an inequality of the pupils. This, if it is accompanied by cephalalgia, should always raise the suspicion of cerebral syphilis. The size of the pupils is an individual matter depending somewhat upon the pigment of the iris; a blue iris admits more light to the retina and consequently arouses the sympathetic reflex which brings about some narrowing of the pupil. Consequently the pupils of blue-eyed people are normally narrower than those of dark-eyed people. When the sympathetic reflex is in good condition a pinch on the side of the face causes contraction of the pupil.

Dangers of the Optician.—Not infrequently it is found, when patients have been wandering from optician to optician, seeking changes of glasses, their eventual visit to the ophthalmologist discloses the presence of some serious disease. Acute parenchymatous nephritis is not infrequently discovered. Toxic amblyopias are frequently the subject of such experimentation on the part of the untrained optician. It must be remembered, however, that hysteria may simulate certain of these serious diseases. Dr. Allen had a case under his care for a time that had been under the care of many previous physicians. The man complained of loss of vision and wandered from physician to physician looking for relief. He was a big, strong, apparently healthy, individual, with regard to whom the last thoughts in the world would have been the possibility of hysterical influences having anything to do with the impairment of his vision. His custom was to give each succeeding ophthalmologist an opportunity to treat him for eight months. Then he changed his physician. Dr. Allen was able to do him no good, but several years later met him again and found that he had been completely cured by the cutting of one of the muscles to his eyes. His impairment of vision was evidently a neurosis. The chorea that occurs every spring in some school children is often due to refractive errors. On the other hand, it must not be forgotten that there may be a suggestive element in these cases.

The General Practitioner and the Ophthalmoscope.—Dr. Higgins, of Cortland, N. Y., said that the general practitioner of medicine must not only be able to recognize the ordinary external diseases of the eye, but should be able to use the ophthalmoscope. All neurologists who take their specialties seriously, now consider it necessary to use the ophthalmoscope, since there are so many diseases of the nervous system that give their preliminary symptoms in the eyeground.

Rheumatic Heredity.—Dr. James J. Walsh, of New York, asked what the eye specialists mean by the term the rheumatic tendency or rheumatic heredity. Acute rheumatism is an acute infectious disease. The most characteristic element of which is that it gets better completely. One might as well speak of a tendency to pneumonia, because in some families pneumonia seems to come easier than in others and because some patients suffer from repeated attacks of the disease. The word rheumatic thus used gives the impression of a diathesis, for which there is no definite basis in medicine.

Dr. Allen, in closing the discussion, said that by the word rheumatic he refers to well-known exudative tendencies that exists in some patients and causes them to have chronic joint affections. In these cases there is a likelihood of the occurrence of exudation that closes up the anterior chamber of the eye and so brings about the increase of intraocular tension known as glaucoma. Dr. Allen considers that every general practitioner should be able to use the ophthalmoscope, but no one, unless very expert, should place too much dependence on his judgment of eye affections, if he has not had a large experience in them, since mistakes with regard to so delicate a structure are dangerous and delay is almost sure to be followed by irretrievable injury to this important sense organ.

Early Diagnosis of Tuberculosis.—Dr. James J. Walsh, of New York City, said that the important element for early diagnosis of tuberculosis is not to be found in the physical signs, which may not give definite information until the disease has made considerable progress, but in the individual environment. Tuberculosis should be considered as an infectious fever. The first question the physician asks with regard to an in-

fectious fever suspected, is, Are there other cases of this disease in the neighborhood? or, Has the patient been in contact with them? This same question should be asked with regard to tuberculosis. It is not the family history that is important, but the history of those with whom the patient is living and working.

Pulse and Temperature.—In suspected infectious disease the physician does not consider that he can give a negative diagnosis, even though he finds no definite localized signs of the disease if the pulse and temperature are in any way disturbed. The important thing, in the light of our modern knowledge, is to discover the presence of tuberculosis as early as possible. The ordinary physical signs may fail in this and it is better to be sure than sorry, and to warn patients of the necessity for care when their constitutional conditions are not entirely reassuring. Dr. Walsh said that in order to take the pulse and temperature properly, observations should not be made once a day, but at least three or four times. In the early morning, at noon and at night. The normal temperature range is about a degree and a half in the twenty-four hours. Even a slight increase of temperature with a localized lengthening of expiration over any part of the lungs, is of itself sufficient to indicate that pulmonary tuberculosis is present. Patients then should be warned of their condition and told of the necessity of taking care as to air and diet, for these will of themselves prove sufficient to bring about a cure in initial cases.

Temperature Rhythm.—Dr. DeLancey Rochester, of Buffalo, said that while normally the temperature is highest in the afternoon it must be remembered that tuberculosis may disturb this normal rhythm and the highest temperature may occur late at night, or even very early in the morning. The patient's temperature, in suspected cases, should be taken as early as six in the morning and as late as ten at night. The pulse is usually disturbed for a considerable period before there is any disturbance of temperature. The first physical sign that there is of diagnostic value, in Dr. Rochester's experience, is a rise in the pitch of the percussion note. Percussion should be made not only over the clavicle in front, but especially over the scapula behind. Patients should be stripped to the waist and their respiration rhythm should be observed very carefully, as sometimes it is slower on the affected side. Dr. Rochester considers that tuberculin is a very important means of making an early diagnosis of tuberculosis.

Insistence on Non-heredity.—Dr. S. A. Knopf, of New York City, said that the salvation of most tuberculous patients depends not on the tuberculous specialist, but on the family physician. He first sees these cases and at a time when cure, or improvement, is comparatively easy. It is his duty to see that no means for the early diagnosis for tuberculosis shall be neglected. To ask the usual question, Did father or mother die of tuberculosis? is to impress upon the patient the idea that the physician believes in direct heredity. This is not only a false notion in itself, but it serves to discourage many patients and give them the idea that their disease is incurable because inherited. As the most important element in the therapeutics of tuberculosis consists in the patient's own feeling of encouragement, it is important to remove the illusion with regard to heredity.

Early Signs of Tuberculosis.—Dr. Knopf said that an excellent way to secure evidence of the tendency of the tuberculous patient's temperature to rise is to take the temperature after exercise. Another early important sign of tuberculosis is what is known as Murat's sign. This consists in having the patient talk loud when there is a distinct feeling of vibration over any solidified area of the lung. Deep expiration gives a fremitus that has been noticed even by the patient himself not infrequently. With regard to occupations and their connection with tuberculosis patients should be asked the details. A clerk working in a shipping department, usually in the basement amid dusty surroundings without light or proper ventilation is much more liable to tuberculosis, than a clerk in the silk department. With regard to tuberculin, as it is sometimes dangerous and has been known to give positive reactions in syphilis actinomycosis and even chlorosis, its use is not advisable.

In closing the discussion, Dr. Walsh said that the constant signs of the earliest stage of tuberculosis are disturbance of pulse and temperature and a localized prolongation of expiration. Change in the percussion note comes later than this and is not constant, for dilatation of the air vesicles in the affected area may lower an abnormally raised note to normal pitch. With regard to tuberculin, very few physicians would care to use the remedy, or have it used on friends. There is a distinct element of danger in its use. It may cause a generalization of the process. For very early stages of tuberculosis this is not justifiable.

Sepsis Treated by Collargol.—Dr. George Tucker Harrison, of New York, read a paper on his experience in the treatment of septic infection by the use of intravenous injections of collargol. He said that silver salts inhibit bacterial growth, though they are not directly bactericidal. Even 1 to 5,000 solution of collargol actively inhibits all pathogenic bacteria. Collargol now comes in the form of scales and granules, which dissolve easily and completely in water, making if necessary a five-per-cent. solution. In solutions of 1-5,000 this may be employed for intravenous injections and actively inhibits bacterial growth in the system. Dr. Harrison has used it in cases of septic osteomyelitis and in polyarthritis septica with excellent results. For septic conditions after labor it is especially effective. A large number of German authorities report very good results with it and Dr. Harrison has been able to confirm their observations. No harm ever came from its employment.

Acute Cholecystitis.—Dr. John H. Musser, of Philadelphia, delivered an address on the subject of acute and chronic cholecystitis. With regard to acute cholecystitis medical literature does not tell how frequent it is, since, in the past the affection was not recognized, and, like in appendicitis, only recent experience is of avail with regard to its character and occurrence. It is evident that it is a very common affection. Not infrequently it occurs after typhoid fever, and it seems very probable, in the present state of our knowledge, that so-called relapses of typhoid fever are not infrequently nothing more than cholecystitis. In certain cases a tumor in the gall-bladder region with localized pain has been noted and the temperature has been reported as not properly typhoid in character. Usually there is a low temperature in the morning and high evening rise, indicating the septic nature of the affection. Cholecystitis is not infrequently a complication of gall-stones though it is also probable that the original tendency to the formation of gall-stones is in most cases due to an attack of cholecystitis.

Types of Cholecystitis.—The affection is mild, severe, or gangrenous, as the corresponding cases of appendicitis and the true character of the affection may escape recognition. As in the case of the appendix there may be colic and the other symptomatology runs parallel. Usually it causes jaundice and this is not infrequently ascribed to a catarrhal process. Catarrhal jaundice, however, is a term which will have to be eliminated to a great extent from medical literature. This form of jaundice commonly follows some infection of the biliary passages. Usually there is pain and tenderness in the region of the gall-bladder, but there may be a complete latency of symptoms, the patient feeling only

uncomfortable, and there being a rise of temperature. In severe cases the symptoms are usually thoroughly localized and it is not difficult to recognize the true nature of the affection. Exquisite tenderness over the fundus of the gall-bladder and rigidity of the muscles in the right hypochondrium are the characteristic features in severe attacks.

Gangrenous Cholecystitis.—In what may be called fulminant cases gangrene develops in from twenty-four to forty-eight hours. As in the corresponding case of gangrene of the appendix, no pain is felt once the gangrenous process asserts itself. The patient may consider himself much better, and it is easy for the attending physician to be led astray into the idea that there is real improvement. Peritonitis follows, however, with nervous disturbances, chill and sometimes rigor and shock. Rigidity and tenderness disappear after the gangrene has set in, and there may be no resistance even to rather deep pressure. The classical position for tenderness is at the ninth rib, but it may be lower down. A previous history of gall-stones is an important auxiliary in the recognition of cholecystitis, but it must not be forgotten that the existence of a previous pathological condition may have caused some dislocation of the gall-bladder. Anomalous positions of the gall-bladder, as is also true of the appendix, may cause displacements of the point of tenderness, so that it may be low down toward the right iliac region, or the tumor may even be median, or be situated a little to the right of the umbilicus, or may be so low down as to be mistaken for appendicitis.

Diagnostic Aids.—Tenderness is the most frequent sign. At times the gall-bladder may be contracted under the ribs, so that it has to be "hooked for," to use the characteristic expression of Dr. John B. Murphy. Nausea and vomiting in cholecystitis are not so frequent as might be expected. They do not occur so often as in appendicitis. The differential diagnosis requires the separation, especially of appendicitis, and in rare cases of pancreatitis. In one case under Dr. Musser's care, the patient presented pain in the epigastrium and tenderness in the median line with a suspicion of cholecystitis. There was, however, an elevation of the apex of the heart, and dull tympany in the left epigastrium. Dr. Musser suspected the presence of pancreatitis as a possibility, and the suspicion proved correct. The only safe course in severe cases is to explore. Nearly 40 per cent. of the unoperated cases die, as against 5 per cent. of those operated upon. Early operation will prevent subsequent pancreatitis and cholelithiasis, both very serious affections.

Shock in Cholecystitis.—Dr. Robert Morris, of New York, said that shock is quite severe in affections of the biliary passages, because these are covered by a network of sympathetic fibers closely in relation with the great sympathetic ganglia of the abdomen, only a short distance from the semilunar ganglion. An affection of the biliary tract is likely to be followed by reflex neurotic symptoms, and this adds another reason for counseling early operation. The physician should not wait for the occurrence of jaundice, before recommending consultation with the surgeon. Dr. Morris has seen a case of acute cholecystitis recently followed by a typical attack of typhoid fever.

Cholecystitis in Typhoid.—Dr. Alexander Lambert, of New York, said that cholecystitis is undoubtedly more frequent after typhoid fever. At times the typhoidal affection may have this for a sequela that gives symptoms for many years. In a patient recently seen the typhoid occurred sixteen years ago. Since then there have been irregular attacks of pain in the epigastrium, considered by various physicians to be due to gall-stones. After a rough sea voyage recently the patient developed a rather severe attack of what was apparently gall-stone colic. The tenderness of the gall-bladder region was marked. Fever continued for some time, and after a while the temperature chart disclosed a characteristic typhoid temperature curve. This ran a mild course, and it seemed evident that the relapse of typhoid fever in the case was due to reinfection from typhoid bacilli stored up in the gall-bladder, which had remained latent, except for occasional mild attacks of cholecystitis for these sixteen years.

Dr. Musser, in closing the discussion, said that besides acute cholecystitis chronic cholecystitis must be considered, though when it entered into this stage, operation was much more difficult. Besides acute pancreatitis, cholecystitis might give rise to chronic pancreatitis, with consequent serious disturbances of metabolism and nutrition.

Surgery of Salpingitis.—Dr. Henry C. Coe, of New York, said that for inflammatory diseases of the appendages after trying both the abdominal and the vaginal route he had come back to the use of the abdominal method. With regard to conservative surgery of the appendages he believes that all adhesions should be broken up and the tubes and ovaries released, but the surgeon may easily err on the side of conservatism with danger of leaving affected tissues that may require subsequent operation. Dr. Coe doubts, for instance, whether it is ever wise to consider that an infected tube can be disinfected by syringing or by any cleansing method. He does not consider that salpingo-salpingostomy and some of the other operations with long names on the tube itself, such as a new implantation of the tube into the uterus, are ever likely to produce good results. He is skeptical of reopening the lumen of the tube that has ever been thoroughly closed up by adhesions. The normal caliber of the tube is too small to furnish basis for any such hope. When portions of the tube must be removed he considers that it is better to remove the organ completely, so as not to run the risk of leaving a stump which may give further trouble. The remote results of the so-called conservative operations are often not favorable, though the patients do not always return to the original operator, but go to someone else to exhibit the failure of the previous operator.

Etiology of Salpingitis.—Dr. Edward J. Ill, of Newark, N. J., said that practically all the affections of the uterine appendages are due to bacteria. It is possible that slight congestions consequent upon exposure and traumatism may simulate the results of infection. On the other hand, circulatory disturbances of passing character are the commonest basis of true salpingitis. There are five specific infections: The gonococcus, the streptococcus, the staphylococcus, the *Bacillus tuberculosis*, and the *Bacillus coli communis*. Gonorrheal infection is the most frequent and always produces serious results. Though its power for harm was pointed out by Noeggerath as early as 1872 it is only in recent years that the proper realization of its possibilities for evil are generally recognized. The streptococcus infections, usually of puerperal origin, are the most fatal, though recent reports seem to show that some remedies may prove of avail against them.

Non-operative Treatment.—Dr. W. Travis Gibb, of New York City, pointed out that it is a mistake to suggest operation for many gynecological conditions of the tubes immediately on seeing the patient. In all cases the patient should be given the benefit of palliative treatment, and where the general heatlh is not good the constitutional condition should be improved, when it will often be found that apparently unbearable symptoms become very much relieved. Operations are often necessary, eventually, but a course of preparatory

treatment, instead of militating against the success of an operation, is likely to prove of service in making the operation more immediately beneficial. Dr. Gibb believes that in all cases an extended course of treatment by douches of hot saline solution should be employed, and tampons of boroglycerite should be packed into the vagina. One tampon is not sufficient, but several should be employed, usually at least three, though there should be no distention of the orifice of the vagina. Patient effort should be employed in this direction, until failure by this means is assured, before operation is recommended.

Palliative Treatment.—Dr. William L. Polk, of New York, said that in gynecology, as in affections of other parts of the body, operative procedures should be avoided until absolutely necessary. Physicians should look for the resolution of inflammatory conditions, and thus spare the patient the necessity for the operation. Where pus actually exists, the rule must be, as in other parts of the body, to evacuate. This can be done through the posterior cul-de-sac of the vagina, without exposing the patient to any serious risk.

Veratrum Viride in Gynecology.—Dr. Bonifield, of Cincinnati, said that the social condition of the patient must form the basis of the judgment as to whether radical or palliative treatment shall be adopted in gynecology. If women are hard-working and must continue their work, then radical operation may be necessary. When, for the same condition, in a woman who does not have to work, palliative measures may be advisable. In Dr. Bonifield's experience, the best drug for the relief of the discomfort attendant on salpingitis is veratrum viride. It relieves pain and has none of the objections of opium. It should be used to its full physiological effect, and for this should be given in subcutaneous injections of eight to fifteen minims for a robust woman, repeated in twelve to fifteen hours, if necessary. It affects the liver, skin and kidneys, and produces excellent satisfaction.

Conservative Gynecology.—Dr. J. Riddle Goffe said that the limits of conservatism in gynecology are not yet thoroughly understood. In acute cases much may yet be accomplished. In chronic cases present experience is all in favor of conservatism. Personally he opens up the fimbriæ of chronically inflamed tubes under a spray of saline solution in the hope of restoring the women to fertility. He does not hesitate to leave the stump of a tube, and considers that the rule should be in favor of conservatism even in ectopic pregnancy.

Ileocolitis in Children.—Dr. Thomas M. Rotch, of Boston, Mass., discussed the clinical aspects of ileocolitis in children. Accepting the distinction made by the American Pediatric Society of simple and fermental diarrhea and ileocolitis, Dr. Rotch has found on investigation that though simple diarrhea is usually considered to be non-organismal in origin, organisms are occasionally found in what would clinically be considered to be no more than simple diarrhea. In fermental diarrhea organisms resembling Shiga's bacillus are occasionally found, though there are other microbes which are also apparently pathogenic. In a series of cases examined, 30 per cent. of those classified as fermental diarrhea proved to have organisms resembling Shiga's bacillus. In ileocolitis 70 per cent. of the cases presented the same organism. It is possible that the clinical distinctions in these cases may be due to the extent of the pathological invasion by the organisms, and the lack of resistive vitality. In the light of Dr. Park's researches in New York it seems probable that there are groups of organisms of which Shiga's bacillus is the characteristic representative of a family.

Colon Bacillus in Genito-urinary Tract.—Dr. Albert H. Ely, of New York, said that in patients of all ages infections of the urinary tract may be found, due to the colon bacillus. In some of these cases, especially in children, the infection is so chronic as to suggest the thought of tuberculosis. When the colon bacillus cystitis occurs, Dr. Ely has frequently found that there was no accompanying infection of the vagina, and especially there were no gonococci present, yet the cases proved very intractable. The use of borolyptol for irrigations was often followed by favorable results, where it fails ichthyol may be employed. In women at the menopause cystitis not infrequently occurs, and the symptoms are not due to an irritable nervous bladder, but apparently to a lack of resistive vitality and infection by colon bacillus.

In discussing Dr. Rotch's paper, Dr. Northrup, of New York, asked if there was not an analogy between dysentery and diphtheria in the varying virulence of the cases, though micro-organisms of the same kind were at work in different patients.

Varieties of Dysentery.—Dr. Holt, of New York, said that he has seen 32 autopsies on patients dead after infection by Shiga's bacillus. In these all grades of colon lesion were found. In Dr. Holt's opinion the serum is still *sub judice*. In mixed infections and in fermental diarrheas, it does no good. In typical cases of dysentery due to Shiga's bacillus, its administration is followed by some remarkable cures.

Summer Diarrhea and Dysentery.—Dr. J. E. Winters, of New York, said that there are two distinct diseases under consideration, summer diarrhea and dysentery. They have no etiological relation to each other. Dysentery is a highly infectious and dangerously contagious disease, even more so than typhoid fever, and requiring more careful prophylactic precautions. In an epidemic of the disease seen at the Hebrew Orphan Asylum, some five or six years ago, 112 cases came under treatment. The toxemia of the disease is almost exactly like that which develops in scarlet fever. No treatment seemed to be of any use at that time. The infection seemed to have come through the water. The dead end of a main near the asylum apparently harbored the bacilli, and it was especially those children who drank water early in the morning, after it had been standing in the pipe overnight, that had been affected.

Shiga Infection.—Dr. Rowland G. Freeman, of New York, said that he had seen 44 cases of Shiga infection last summer, in three institutions. All had blood and mucus in the stools, though the cases were of varying degrees of severity. The fatality varies greatly in different institutions. In one 19 out of 22 patients died, in another only 2 out of 13. Serum was used in every second case under treatment. The mortality was very slightly in favor of serum cases. Dr. Freeman considers that the present dose of serum is far too small. In the pathology of the cases Dr. Freeman had observed ileocolitis as always present.

Dr. Frederick Holme Wiggin, the retiring president of the Association, then presented to the members the newly elected president, Dr. William Harvey Thornton, of Buffalo, and the meeting adjourned.

NORTHWEST MEDICAL SOCIETY OF PHILADELPHIA.

Stated Meeting, Tuesday, September 8, 1903.

President, Wm. Egbert Robertson, M.D., in the Chair.

Certain Conceptions Regarding Maternal Impressions, Heredity and the Genesis of Tumors.—This paper was read by Dr. W. Wayne Babcock. He traced the development of the fetus from the moment of conception and called attention to the general impression that after conception the mother had no influence over

the fetus except from malnutrition and the injection of poisons into the body. He then referred to the possibility of certain cells from the mother having certain influence over the fetus being thrown into the circulatory system of the child, and remarked the fact that there were particular substances in the blood having a particular effect over particular cells, such as the hepato-lysins, which will dissolve liver cells, while other cells will be uninfluenced by them. Experiments have shown that the blood of lower animals does not contain these substances, and while it has not been demonstrated that there is a specific substance in the blood of each cell in the body, yet the fact has been shown that certain cells from certain sources would be acted upon by certain substances in the blood which would have no effect on other cells. He believed that not only the cruder changes could be effected in this manner, but that it might be demonstrated on the central nervous system, and that it might take place even after the organ was formed either by the formation of, or the increase in the amount of these substances in the blood of the mother and transferred to the child. He believed the same methods could be applied to the development of tumors in the various parts of the body. He referred to the theory of Cohnheim that certain cells predominated in certain parts of the body, and the consequent development of tumors if they were excessive in amount. The author felt that the formation of tumors could be explained as well by the absence of these substances, and compared it to the case of injecting epithelial cells into the arm, where they would be quickly destroyed, whereas if they were injected into a granulating surface, they would rapidly develop.

Dr. Wilmer Krusen stated that the obstetrical world was divided as to the influence which caused these conditions; one side maintaining that it was the physical influence and the other that it was the psychical influence. He felt that the widespread idea which existed among the laity of this influence was sufficient to warrant the profession in giving some attention to it, and while it was hard to understand how the influence could be exerted after the various organs were formed, he felt that this was possible in the methods outlined by Dr. Babcock. He referred to a case reported by Dr. Barton Cooke Hirst, in which the husband had dragged the mother of the child around by the ear during pregnancy, and the child was born with a triangular piece out of the ear.

Dr. Arthur P. Hitchens referred to the experiments of injecting potassium bichromate into a rabbit to destroy the kidney cells, and in a short time the blood of that animal would produce a like effect upon the kidney cells of another rabbit, the same being true of phosphorus injected into a rabbit in sufficient doses to cause hepatic trouble, which he felt was similar to the mother having tuberculosis during pregnancy, the pneumolysins in her blood would be communicated to the blood of the fetus, and while they would not be sufficient to destroy the lung tissues they would probably be much weakened.

Dr. Wm. Egbert Robertson viewed the theory advanced by Dr. Babcock favorably, but believed that the impressions might be caused either by the psychical effect or by transmission through the blood of the mother to the child.

Dr. W. Wayne Babcock, in closing, referred to the work of Dr. Flexner and others, which had shown that there existed in the blood certain distinct solvent substances for renal cells, hepatic cells, spermatozoa, etc., and that after the element in the blood which destroyed one class of these cells had been destroyed, there still remained substances which had the power of destroying cells of the other classes, and suggested the probability that substances existed in the blood, applicable not only to these substances but to all cells in the body. He reported two cases, the first of which the mother was burned so that she died in a short time. The fetus was nearly full term and showed areas of atheroma exactly corresponding to the burns on the mother. The other case, the child had only two fingers on each hand. The mother when about six weeks' pregnant had been handed a glass of water by a man whose hands were in this condition, and was quite shocked and continually talked about the matter during pregnancy.

Dionin—A New and Valuable Agent in Ophthalmic Therapeutics.—This was the title of a paper read by Dr. Wendell Reber, in which he remarked that the ethyl compounds were superior to the methylic in ophthalmic work, which was probably the reason dionin had found such favor, it being an ethyl compound. After dealing at some length with the composition of this drug, he referred to its use by Schroeder, in phthisis, chronic bronchitis and pulmonary emphysema, who had found it superior to codeine or morphine in these conditions. The drug was first introduced into ophthalmic work by Wolffberg, of Breslau, who claims that as well as a profound analgesic power, it exerts a favorable influence upon a morbid process, facilitating dilatation of the pupil when it is slow under the action of morphine. After giving a careful résumé of the literature on the subject, he stated that he had used the drug in the following conditions: (1) Postoperative complications; (2) iritis; (3) interstitial keratitis; (4) vitreous opacities; (5) glaucoma; (6) corneal opacities; (7) sympathetic ophthalmia. He stated that the first case in which he had employed dionin was one of iritis with the development of a bacterial colony in the anterior portion of the vitreous humor with impending panophthalmitis following needling of a secondary capsular cataract. The next day the patient was entirely free from pain, and in five days the capsule of the lens had entirely disappeared and the bacterial colony was gone. The author stated that he had used dionin in two subsequent cases of cataract with excellent results. In the cases of iritis in which he had employed the drug, there had been a relief of the pain in two hours. In two cases of interstitial keratitis, the dionin not only assisted the atropine, but promoted absorption of the newly-formed matter in the stroma of the cornea. In two cases of vitreous opacity (senile) and one case of corneal opacity occurring in a child five years old, no effect was produced, although some writers have reported good results in these conditions. In a case of corneal ulcer (probably of pneumococcic type), occurring in a woman aged sixty-nine years, who had suffered for four years past with absolute glaucoma of the right eye, a 10-per-cent. solution of dionin was combined with the eserin collyrium she had previously been using and within twenty-four hours she was entirely free from pain and the tension of the eye had been considerably reduced. In one case of sympathetic ophthalmia dionin was found to be of great service in promoting absorption of the plastic exudate in the pupillary space after the removal of diseased eye. Dionin relieves pain without in any way affecting sensibility, and it also acts as a lymphagogue, stimulating the lymphatic and vascular circulation of the eye. The drug may be used in four forms, *i.e.*, powder, solution, ointment, cocoanut butter rods, the form in which it is used depending largely upon the personal preference of the operator and the exigency of the case.

Dr. Reber, in closing, stated that whether the action of dionin was due to its irritating or counterirritating effect was not known, but that there was no other known irritant or counterirritant that would produce the same effect. He stated that it was very efficient

in accelerating the work of the lymphatic circulation of the anterior portion of the eye and was also claimed to promote absorption of the subconjunctival extravasation of blood. He remarked that in about three-fifths of the patients sneezing for a short time would follow its application.

BOOK REVIEWS.

DORLAND'S AMERICAN ILLUSTRATED DICTIONARY. By W. A. NEWMAN DORLAND, A.M., M.D. Third edition. W. B. Saunders & Co., Philadelphia, New York and London.

IN a previous number of the MEDICAL NEWS we have had occasion to recommend in unqualified terms this volume of Dr. Dorland's as one of the most convenient of the compact dictionaries. It is unique in its features of grouping allied subjects under one heading, and for the brevity of its definitions we know of no dictionary that approaches it. We can commend to our readers the third edition as fully up-to-date and as reflecting the advances of modern medicine in a most satisfactory manner.

A MANUAL OF OBSTETRICS. By A. F. A. King, A.M., M.D., Professor of Obstetrics and Diseases of Women and Children, Medical Department of Columbia University. Ninth edition, revised and enlarged. Lea Brothers & Co., New York and Philadelphia.

KING'S Manual has occupied a position *sui generis* among the smaller works devoted to obstetrics, as the most succinct, reliable and at the same time individual book for a student and practitioner. We can add very little to our previous commendation of this book, as its merits are well known to the physicians of this country.

Believing as we do that obstetrics, as a science and as an art is too much neglected by the general practitioner, to the detriment of the health of many of their clients, we cannot urge too strongly the merits of a book of this kind.

A SYSTEM OF PHYSIOLOGIC THERAPEUTICS. Edited by SOLOMON SOLIS COHEN. Vol. VIII. Rest, Mental Therapeutics, Suggestion. By FRANCIS X. DERCUM, M.D., Ph.D., Professor of Nervous and Mental Diseases in the Jefferson Medical College, of Philadelphia. P. Blakiston's Son & Co., Philadelphia.

WE feel that we can congratulate Dr. Cohen most heartily on the appearance of Volume VIII of his System. He is particularly fortunate in the choice of his present author and in the method in which the subject has been handled.

We all know that as physicians we are too much inclined to tell our patients to go and take a rest, without giving them specific directions how best to do it. We are all both consciously and unconsciously practising crude formulæ of mental suggestion without any well-defined and coherent system with which to make our suggestions more effective, and in the general management of the sick we are all most too prone to turn over details to an intelligent relative, an old lady in the neighborhood, or a trained nurse.

It is just along these lines that Dr. Dercum's book offers a most fruitful series of helpful ideas.

He considers in detail the various forms of rest cure, discussing particularly the fatigue neuroses, neurasthenia, hysteria, hypochondriasis and the application of rest to a number of organic diseases. In his therapeutics of mental diseases, he discusses the general principles of the treatment of the insane and gives a very excellent summary of the modes of treating the drug habits.

The chapter on suggestion is particularly helpful, and we can cordially recommend this volume to the general practitioner.

JAHRESBERICHT ÜBER DIE FORTSCHRITTE IN DER LEHRE VON DEN PATHOGENEN MIKROORGANISMEN UMFASSEND BACTERIEN, PILZE UND PROTOZOEN. Von Dr. P. von Baumgarten and F. Tangl. Seventeenth year, 1901. Second part. S. Hirzel, Leipzig.

THE last issue of Baumgarten's Jahresbericht contains the same wealth of references as the former volume. We believe that there is nothing like this published anywhere else in any other language and there is no question but that the student in microparasitology cannot get along without it.

We are more than pleased to note that a work of this kind, of such high character and completeness, can be published at a reasonable profit by the publishers, and we hope for this Jahresbericht many more years of successful continuance.

BOOKS RECEIVED.

The MEDICAL NEWS *acknowledges the receipt of the following new publications. Reviews of those possessing special interest for the readers of the* MEDICAL NEWS *will shortly appear.*

ENCYCLOPEDIA MEDICA. Volumes 7 to 13. Liver to Zinc Poisoning. 8vo. Longmans, Green & Co., New York.

DISEASES OF THE SKIN. By Dr. Malcolm Morris. New edition. 12mo, 642 pages. Illustrated. W. T. Keener & Co., Chicago.

PHYSICS AND INORGANIC CHEMISTRY. By Dr. A. McGlannan. 12mo, 215 pages. Lea Brothers & Co., Philadelphia and New York.

PHYSICAL DIAGNOSIS. By Dr. Richard C. Cabot. Second revised edition. 8vo, 320 pages. Illustrated. Wm. Wood & Co., New York.

MEDICAL DIRECTORY OF NEW YORK, NEW JERSEY AND CONNECTICUT, 1903. 1,050 pages. New York State Medical Association, New York.

TRANSACTIONS OF THE AMERICAN PEDIATRIC SOCIETY. Edited by Dr. W. L. Carr. 8vo, 310 pages. Illustrated. Archives of Pediatrics, New York.

A TEXT-BOOK OF OBSTETRICS. By Dr. B. C. Hirst. 8vo, 900 pages. Illustrated. W. B. Saunders & Co., Philadelphia, New York and London.

MEDICAL MISCROSCOPY. By Drs. M. I. Cross and M. J. Cole. Third revised edition. 8vo, 292 pages. Illustrated. W. T. Keener & Co., Chicago.

NOSE AND THROAT WORK FOR THE GENERAL PRACTITIONER. By Dr. G. L. Richards. 12mo, 330 pages. Illustrated. International Journal of Surgery Co.

AMERICAN POCKET MEDICAL DICTIONARY. Edited by W. A. N. Dorland. Fourth edition. 12mo, 566 pages. W. B. Saunders & Co., Philadelphia, New York and London.

AMERICAN TEXT-BOOK OF SURGERY. Edited by Drs. W. W. Keen and J. W. Wight. Fourth edition. 8vo, 1,363 pages. Illustrated. W. B. Saunders & Co., Philadelphia, New York and London.

SURGICAL HANDBOOK FOR THE USE OF STUDENTS, PRACTITIONERS, HOUSE SURGEONS AND DRESSERS. By Drs. F. M. Caird and C. W. Cathcart. Twelfth edition. 12mo, 323 pages. Illustrated. W. T. Keener & Co., Chicago.